KYOCERA

No.	419-01-50-RA3BK02

CONTAX TVS

Repair Manual

京セラ株式会社
海外営業部
'94. 3. 23
発行

Approved by	Made by
風 '94.3.18 嵐	氏 '94. 3. 18 家

KYOCERA CORPORATION
Optical Equipment Group
Service Dept.3BK 940318

No.	419−01−50−RA3BK02

CONTENTS

A. GENERAL & TECHNICAL INFORMATION

· Features ..... A – 2
· Specifications ..... A – 4
· Names of Parts ..... A – 6
· Display ..... A – 7
· Setting of Custom Functions ..... A – 9
· Program AE Control ..... A – 11
· Effective Range of the Built – in Flash ..... A – 12
· Description of Mechanism ..... A – 13
· Circuit Block Diagram ..... A – 16
· Timing Chart ..... A – 17
· Description of Electric Circuitry ..... A – 18
· Description of Functions of IC Terminals ..... A – 30
· Description of Functions of Electric Parts ..... A – 43
· Functions of Switches ..... A – 48
· Schematic Diagram ..... A – 51

B. DISASSEMBLY & REASSEMBLY PROCEDURES

· Removal of Exterior Parts ..... B – 2
· Removal of Main FPC Ass'y ..... B – 6
· Removal of Flash Board Ass'y ..... B – 10
· Removal of Lens Barrel Ass'y ..... B – 12
· Removal of Other Parts ..... B – 14
· Installation of Ass'y Parts ..... B – 15
· Dressing of Lead Wires ..... B – 20
· Disassembly of Data Back ..... B – 21
· Parts Modification List ..... B – 23
· Notes on Repair ..... B – 31

C. ADJUSTMENT PROCEDURES, ETC.

· Description of Manual Adjustment Modes ..... C – 2
· Manual Adjustment Procedure ..... C – 21
· Others ..... C – 48
· Electrical Elements Locating Diagrams & Test Points ..... C – 49
· Wiring Diagram ..... C – 54

A. GENERAL & TECHNICAL INFORMATION

[FEATURES]

1. ZOOM LENS INCORPORATED TO ASSURE EXPANSION OF PHOTOGRAPHIC CREATIVITY

"Carl Zeiss T * Vario Sonnar 28 ~ 56mm f / 3.5 ~ f / 6.5"

The CONTAX T VS incorporates the "Vario Sonnar T * 28 ~ 56mm f / 3.5 ~ f / 6.5" consisting of aspherical elements, newly developed by Carl Zeiss, who is reputed for the world No.1 quality of their products.
This lens is outstanding in contrast reproduction, color reproduction and blurred Phase image. The camera employs a retractable lens mechanism to incorporate this excellent optical system in a small camera body.
The aperture stop - down mechanism used is a 7 - blade diaphragm type situated between the elements, which remains almost perfectly round.

2. FOCUSING SYSTEM SELECTABLE FOR THE BEST SHOOTING

"Auto or manual focusing switchable"

The camera is provided with manual and auto focusing mechanisms so that the photographer can take exactly the same picture as he desires by making full use of the superb image reproduction capability of the excellent lens. The auto focusing mechanism assures fast and easy focusing. The manual focusing mechanism allows the user to perform focusing by consulting the focus display in the viewfinder or preset the focusing distance. Either of these two focusing mechanisms can be selected according to the photo - graphic conditions or the user's taste.

3. AE SYSTEM TO REFLECT THE PHOTOGRAPHER'S VISION

"Aperture - priority program AE and exposure compensation mechanism"

For exposure control, the camera incorporates an aperture - priority program AE mode that combines aperture - priority AE, which are favored the best by professional and advanced amateur creative photo - graphers, and program AE, which is popular among general photographers. The aperture - priority program AE system not only allows the photographer to freely change the depth of field from the full - open aperture of f / 3.5 to the smallest aperture of f / 16 but also automatically stops down the aperture when the limit of shutter speed is exceeded. The camera is also provided with an exposure compensation mechanism for minute exposure adjustments of +5EV to −5EV in 1 / 3 EV increments, which enables the photographer to express his sense of exposure minutely.

4. LARGE, EASY - TO - SEE VIEWFINDER DISPLAY

"Real - image viewfinder and parallax frame display function"

The CONTAX T VS employs a large real - image viewfinder coupled with the zoom mechanism.
The viewfinder display includes necessary photographic information, such as shutter speed, exposure compensation, focus indicator and flash ready signal, which are arranged in a way easy to see.
The automatic compensation mechanism using transmissible LCD indicates correctly picture formats for parallax compensation and even at panoramic picture taking. Like the CONTAX T2, the CONTAX T VS employs sapphire for the viewfinder front element and eyepiece.
The viewfinder will provide very bright, sharp viewing forever.

5. BEST MATERIALS TO ASSURE LONG USE

"Titanium cover, ceramic film pressure plate and multi - crystal sapphire shutter release button"

Like the CONTAX T2, the CONTAX T VS uses titanium, a lightweight and strong metal, for the camera body so that the user can be proud of his possession of this camera and use it for a long time.
The titanium body not only protects the internal precision parts but also maintains its beautiful appearance forever. The film pressure plate made of ceramic is free from distortion due to external force, quality degradation with time or chemical change and thus much more precise and strong than the conventional one. The shutter release button, made of multicrystallized sapphire, will never lose its beautiful gloss. Also this material is pleasant to the touch.

No.	419–01–50–RA3BK02

CONTAX T VS SPECIFICATIONS

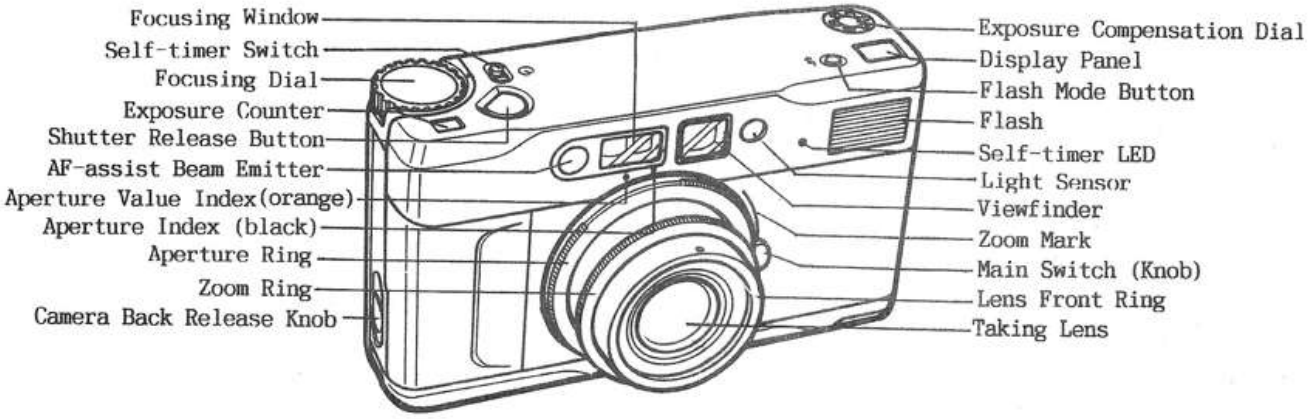
Type	:	35mm lens shutter AE compact zoom camera
Lens	:	Carl Zeiss T * Vario Sonnar 28 ~ 56mm f / 3.5 ~ f / 6.5; 6 elements in 6 groups Aperture: f 3.5 ~ f / 16 at 28mm position Picture – taking distance: 0.5m (1.6 ft.) ~ infinity Zooming: Manual Filter size: 30.5mm screw – in
Shutter	:	Aperture – priority program AE electronic shutter Speed: 16 seconds ~ 1 / 700 sec. in Program AE; 16 seconds ~ 1 / 500 sec. in Aperture – priority AE (the fastest shutter speed varies depending upon the pre – set aperture) Release: Electronic Self – timer: Electronic 10 – sec. delay, cancellable
Exposure Control	:	Aperture – priority program AE Metering range (ISO100): EV – 0.4 ~ EV17 Metering: External light metering system by SPD cell Exposure compensation: ± 5EV in 1 / 3 EV increments Film speed coupling range: Automatic setting with DX – coded films from ISO25 to ISO5000; Non – DX – coded films default to ISO100 automatically AE lock by half release in auto / manual focus modes
Viewfinder	:	Real – image zoom finder Magnification and field of view: 0.38X ~ 0.68X & 83% at the distance of 3 meters (9.8 ft.) Automatic picture area compensation by transmissible LCD Information: Picture frame indicates the areas of standard photo, standard close – up photo, panoramic photo & panoramic close – up photo; shutter speed, focus frame, focus indicator, exposure compensation indicator, flash mark, program mark, selftimer indicator & switch OFF mark are visible
Focusing	:	Auto or manual focusing is switchable with the focus dial Distance metering: External passive system Focus lock only in auto focus mode Infrared AF – assist beam
Flash	:	Built – in Exposure control: By flashmatic system in the Program AE mode and by guide number control in the Aperture – priority AE mode Recycling time: Approx. 4 seconds with a fresh battery at a normal temperature Flash modes: Auto – flash, fill – in flash, pre – flash and flash – off (night scene mode) Flash range: 0.5m (1.6 ft.) to 3.7m (12.1 ft.) at 28mm position and 0.5m (1.6 ft.) to 2.4m (7.9 ft.) at 56mm position (ISO100) External flash unit can be used with the optional Contax T VS flash adaptor SA – 1
Film Loading	:	Automatic: a film advances to the first frame
Film Advance	:	Automatic

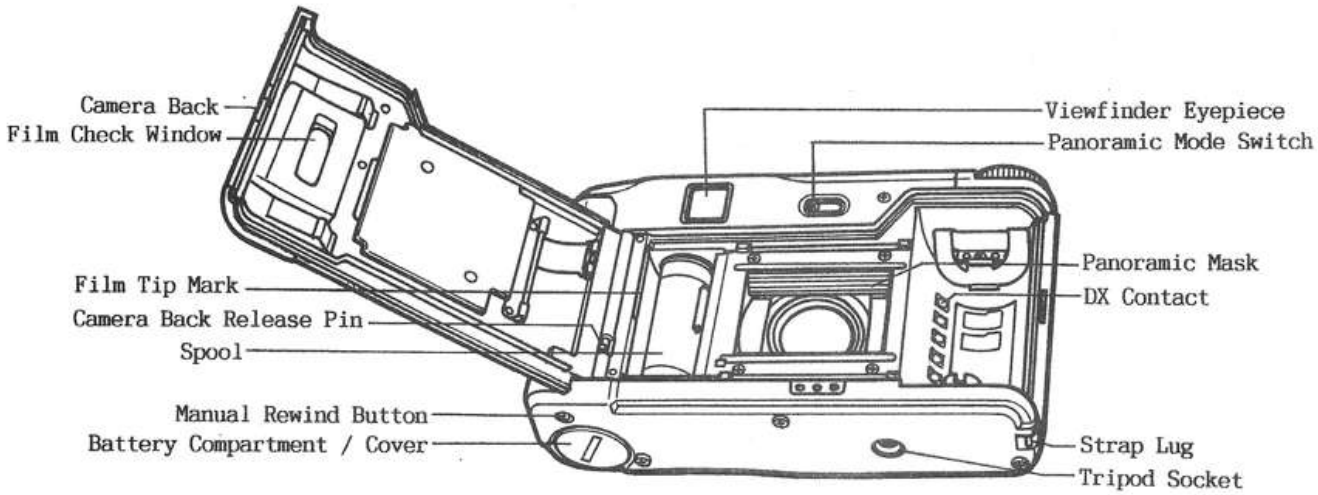
Film Rewinding	:	Auto return and auto stop; mid – roll rewinding possible
Picture Size	:	Standard picture size (24 × 36mm) (15 / 16 × 1 – 7 / 16 in.) is switchable to panoramic picure size (13 × 36mm) (1 / 2 × 7 / 16 in.) by the knob and vice versa
Exposure Counter	:	LCD, automatic resetting, additive type; this counter also indicates a lens focal length in use, the remaining time at the self – timer setting and the elapsed time at the Bulb exposure
LCD Display	:	Flash modes, exposure compensation and battery warning
Power Source	:	One 3V lithium battery (CR123A or DL123A)
Dimensions	:	123 (W) × 67 (H) × 41.5 (D) mm (4 – 7 / 8 × 2 – 11 / 16 × 1 – 11 / 16 in.)
Weight	:	375g (13.3 oz.) (w / o battery)

Specifications of the Contax T VS Data Back (Optional)

Type	:	Built – in quarz clock with liquid crystal display
Position of imprint	:	Lower right corner
Details of imprint	:	(1) Year / month / day (2) Day / hour / minute (3) No imprint (4) Month / day / year (5) Day / month / year (automatic date correction) Imprinting is also possible in the panoramic format
Imprinting	:	Automatically coupled with the shutter activation (with the imprint check indication)
Power source	:	One 3V lithium battery (CR2025)
Dimensions	:	104.5 (W) × 59 (H) × 16 (D) mm (4 – 1 / 8 × 2 – 5 / 16 × 5 / 8 in.)
Weight	:	60g (2.1 oz.) (w / o battery)

[NAMES OF PARTS]





[DISPLAY]

The Display Panel and Viewfinder Display indicate the current information when the Main Switch is turned on. The viewfinder display will automatically go out eight seconds later to save power.
The Display Panel, however, lights up to display necessary information even in the power - off state.
The viewfinder display will light up again when the Shutter Release Button, Zoom Ring, Focus Dial or Flash Mode Button is operated with the Main Switch turned on. The viewfinder display is not lit while the shutter is open (during exposure). When the Main Switch is turned off, the display on the Display Panel and the viewfinder display will go out. The Exposure Counter always displays exposure count even with the Main Switch turned off.

<Display Panel>

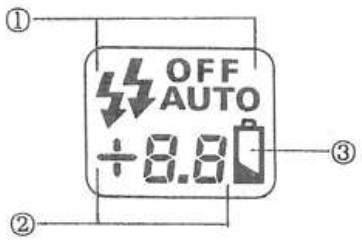
① **Flash mode display**
Displays one of the following built - in flash modes.

- Auto - flash mode ϟAUTO
- Red - eye reduction pre - flash mode ϟAUTO
- Flash - off mode ϟOFF
- Fill - in flash mode ϟ

② **Exposure compensation value**
Not displayed when there is no compensation.

③ **Battery warning mark**
Lights up when battery requires replacing.

Display Panel



<Exposure Counter>

- Displays the exposure count.
- Displays a lens focal length. (When Shutter Release Button is depressed halfway.)
- Displays the remaining time at the self - timer setting.
- Displays the elapsed time at the Bulb exposure.

Exposure Counter

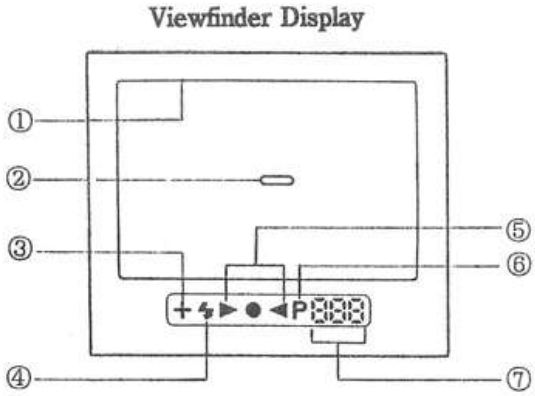
<Viewfinder Display>

① **Picture area frame**
When the Shutter Release Button is depressed halfway, the picture area frame is automatically changed according to the camera - to - subject distance, lens focal length, etc.

- At close - up shooting, the picture area frame is displayed while pressing the Shutter Release Button halfway down and for about two seconds after quitting press of the button in auto focusing mode.
  It is displayed at setting the focusing distance in manual focusing mode.
- A panoramic picture frame is displayed in panoramic mode.

② **Focus frame**
The frame for focusing on the subject.

Viewfinder Display



③ **Exposure compensation display**
When exposure is compensated,"+" or "−" is displayed according to the type of compensation.

④ **Flash mark**
Displayed at flash shooting. The mark blinks while the flash is charging and lights up with steady light when the flash is fully charged.

⑤ **Focus indicator**
Indicates the focus.

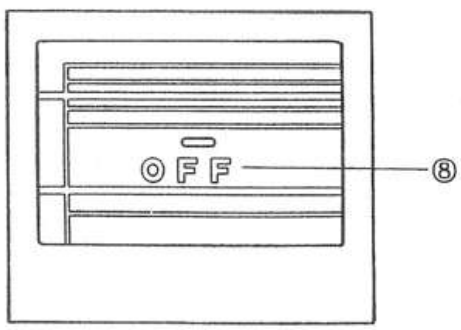
- Auto focus mode
  - " ▶ " mark blinking: Too close distance warning
    Shutter release locked
  - " ● " mark blinking: Close distance warning
    (0.3m or less)
    Shutter release allowed but
    correct focusing impossible
  - " ▶◀ " mark blinking: Distance metering impossible
    Shutter release locked
  - " ● " mark lighting up: In − focus
- Manual focus mode
  - " ◀ " mark lighting up: Front focus
  - " ● " mark lighting up: In − focus
  - " ▶ " mark lighting up: Rear focus
  - " ▶◀ " mark blinking: Distance metering impossible

⑥ **Program mark** ·····Program AE mode

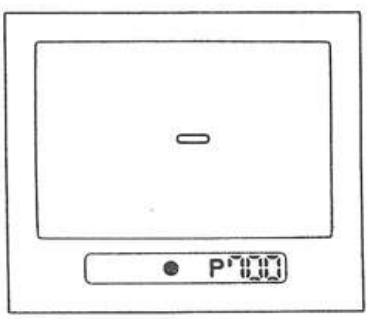
⑦ **Shutter speed display**
Displays a shutter speed in a range of 700 (1 / 700 sec.) to 16" (16 sec.).

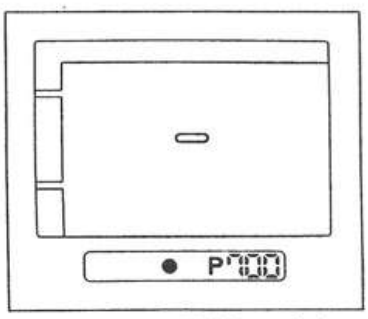
- Shutter speed are displayed in 1/2 − step increments.
- The blinking of "P700" or "500" signifies overexposure and that of "16" means that 16 sec or more exposure is required.
  Keep pressing the Shutter Release Button for a while, and the bulb exposure mode will be set.

⑧ **OFF mark**
Displayed when the Main Switch is turned off.

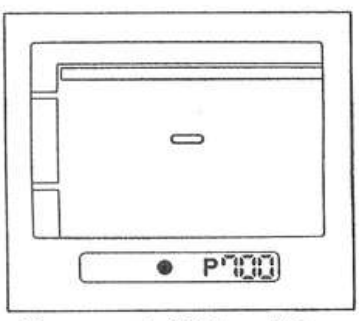


Standard Picture Formats



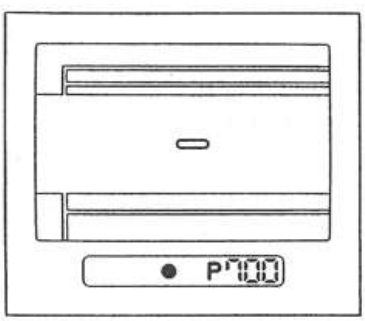


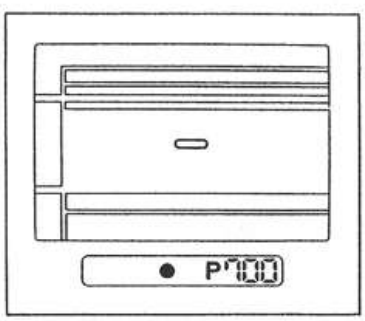
Close−up at WIDE position
(1.0~0.5m)



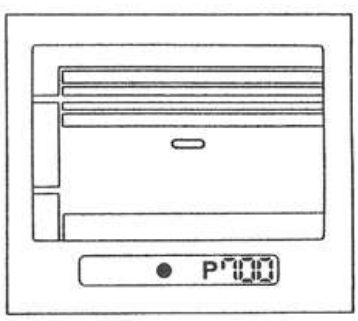
Close−up at TELE position
(1.0~0.5m)

Panoramic Picture Formats





Close−up at WIDE position
(1.0~0.5m)



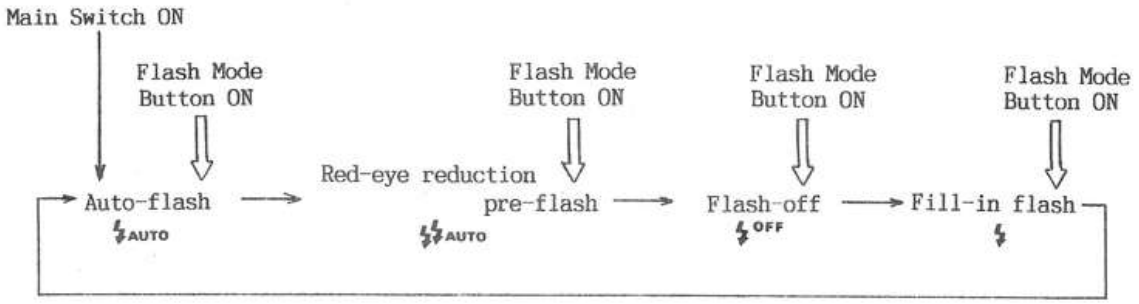
Close−up at TELE position
(1.0~0.5m)

[Setting of Custom Functions]

In custom function mode, the operation procedure for flash mode and focusing can be changed.

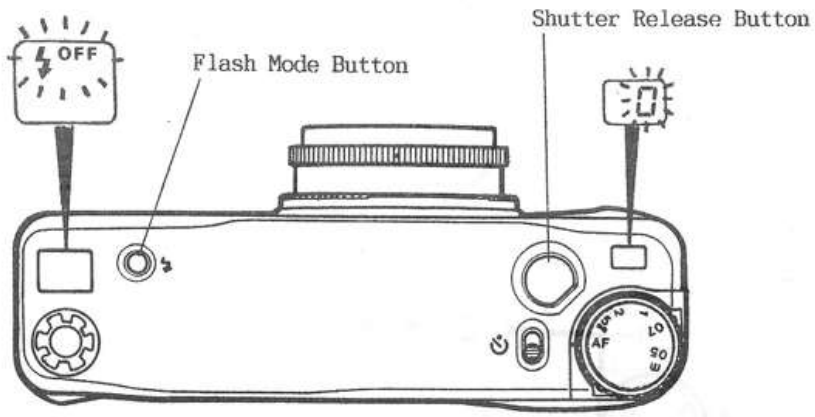
<Change of flash mode setting>

* Without any change, auto - flash mode " ϟAUTO " is set first when the Main Switch is turned on. However, flash mode setting can be changed so that the flash mode to be used frequently will be set first.



1) Press the Flash Mode Button (for about 3 sec or more) until the flash mode display on the Display Panel starts blinking.
2) After that, quit your press of the button once and then press the button again until the display of the flash mode to be set first appears (blinking).
3) Quit your press of the button, and the display will change from blinking to lighting up about eight seconds later.
   The flash mode lighting up at this point will be set first at subsequent operations of the Main Switch.

* The relative sequence in which the flash modes are displayed will not change.
* The change from display blinking to lighting up for setting the first flash mode can be effected by turning off the Main Switch or pressing the Shutter Release Button halfway down.
* The exposure counter blinks when the flash mode display blinks.



<Change of focusing timing>

* In this camera, after a full press of the Shutter Release Button, the lens drives to focus itself and then the shutter operates. For shooting with emphasis placed on shutter chance, however, focusing timing can be changed so that the lens drives to adjust the focus at a half press of the Shutter Release Button.

1) Press and hold on the Flash Mode Button (for about 3 sec or more) until the exposure counter displays a one - digit number "0" and starts blinking.

2) If the number blinks, change the Self - timer Switch position by one cycle ("OFF" → "ON" → "OFF"). At each one cycle change of the Self - timer Switch position, the counter displays "1" or "0". Set your desired number.

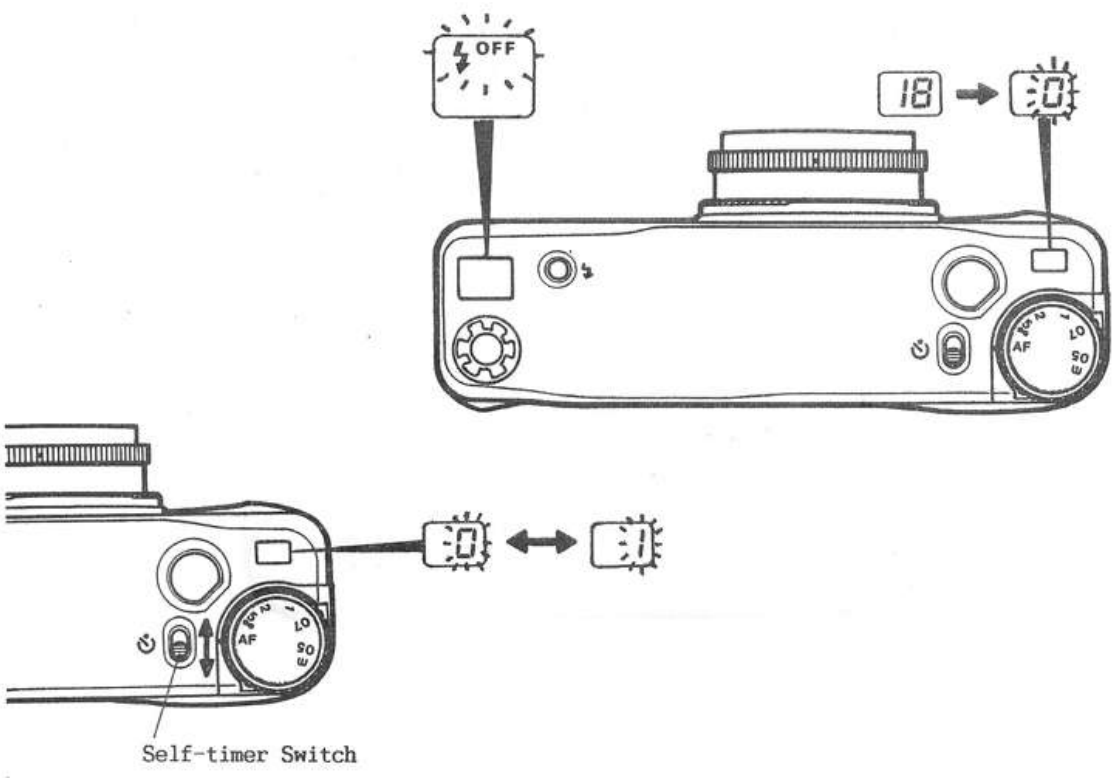
   When "0" is set: After a full press of the Shutter Release Button, the lens drives to focus itself and then the shutter operates.

   When "1" is set: At a half press of the Shutter Release Button, the lens advances to focus itself and moves forward to the focusing position. After that, at a full press of the Shutter Release Button, the shutter operates.

* In "1" mode, at a half press of the Shutter Release Button, a sound of the lens driving is heard. But it does not mean that picture has been taken.

3) The exposure counter will change to the exposure count display status (lighting up) about eight seconds after the operation of the change of focusing timing.

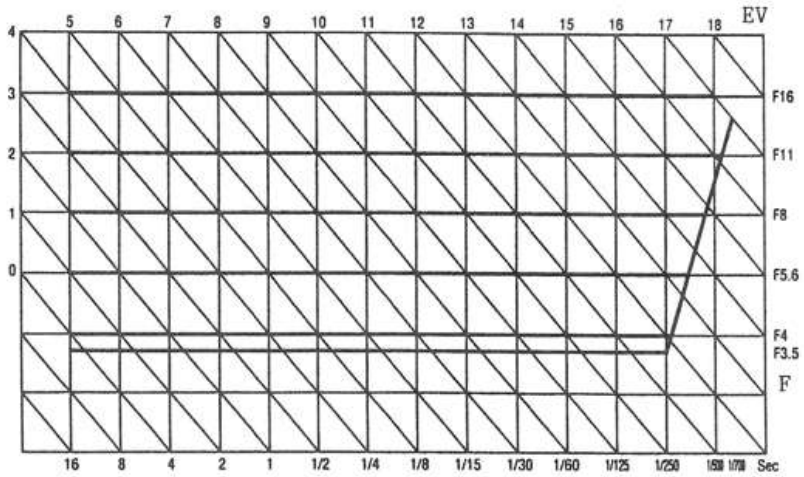
* When the exposure counter starts blinking, the flash mode changes and starts blinking. Be sure to correct the flash mode by the procedure foe change of flash mode setting (see previous page).



[Program AE Control]

The control diagram below shows the relationship of the shutter speeds and aperture values to the EV values in the program AE mode.

Exposure Control Diagram
(Focal length: 28mm)



Shutter Speed

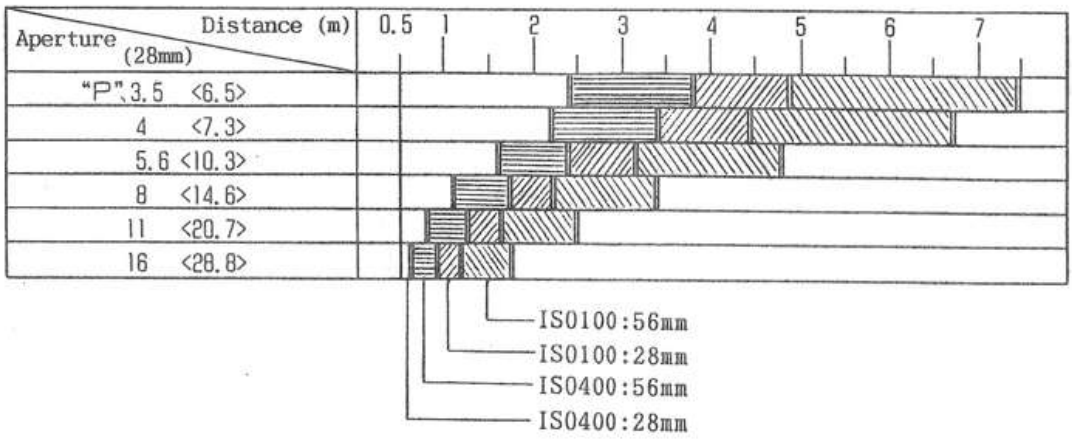
* The aperture – priority mode is automatically switched to the program AE mode when the subject is too bright to give a proper exposure at any shutter speed within the range determined by a preset aperture. In the program AE mode, a maximum of 1 / 700 sec shutter speed is available. "P" appears in the view – finder at the setting of the program AE mode. When f / 16 has been set, the change to the program AE mode does not occur. In this case, the maximum shutter speed is 1 / 500 sec.

* When "P700" blinks in the shutter speed display position in the viewfinder, the AE control range will be exceeded, thus resulting in overexposure.
With an aperture of f / 16, the blinking of "500" signifies overexposure.

* The blinking of "16" indicates that underexposure will occur. In this case, keep pressing the Shutter Release Button for 16 sec to set the Bulb exposure mode.

[Effective Range of the Built - in Flash]

* The camera performs flashmatic (FM) control in the program AE mode "P" and guide number (GNo.) control for changing the flash intensity in the aperture - priority AE mode (when an aperture has been set). FM control is performed when the program AE mode has been set from distance, zoom, ISO and exposure compensation information and flash intensity (GNo.) is controlled when the aperture - priority AE mode has been set.



* The values within < > are aperture values corresponding to 56 mm.

Flash Intensity (ISO100)

- GNo. control in aperture - priority AE mode
  GNo. 1 ～ 14 (1 / 8 step)
- Normal mode: Full flash GNo.14
  Minimum flash GNo.1
- Pre - flash mode: Pre - flash GNo.3
  Minimum flash GNo.1
  Main flash GNo.1 ～ 14

[DESCRIPTION OF MECHANISM]

1. Taking Lens

The tacking lens of this camera is a Vario Sonnar T*28 ~ 56mm f / 3.5 ~ f / 16 newly designed by Carl Zeiss, which employs aspherical lenses as the No.1, 2 and 3 elements. Fig. 1 shows the structure of the taking lens.
This lens consists of six elements in six groups four elements in the front group and two elements in the rear group. The shortest picture - taking distance is 0.5m.

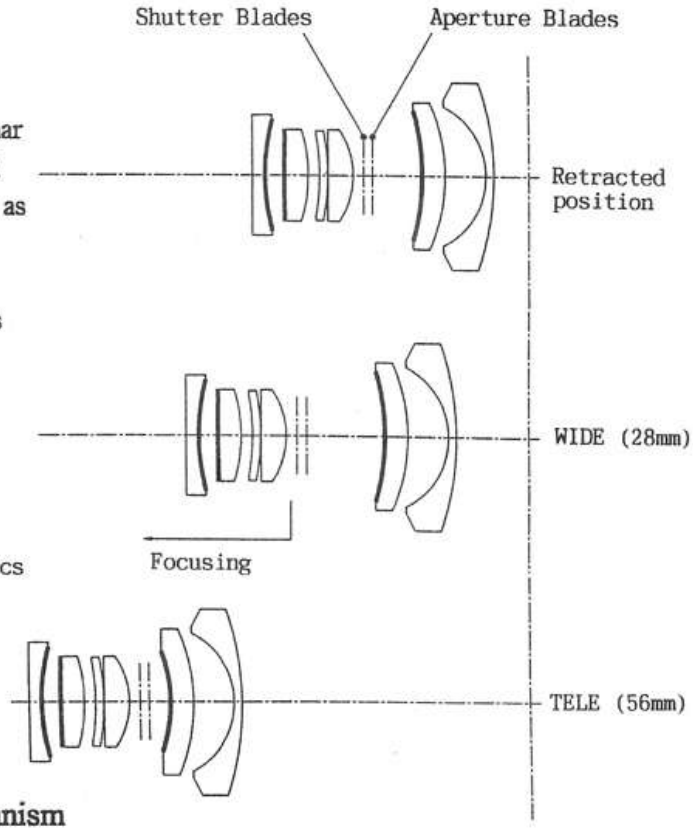


Fig.1 Lens Construction Diagram

2. Zoom and Aperture Stop - down Mechanism

The zoom and aperture stop - down mechanism consists of ① Lens Barrel Unit, ② Front Cover Unit and ③ Position Detector Unit.
The retracting / zooming of the taking lens can be performed manually and it is easily known whether or not the lens is in the shooting position. (Fig. 2)

- The Lens Barrel Unit consists of an electronic shutter and 7 - blade diaphragm situated between the front group and the rear group and a friction ring, which protects the taking lens from an excessive rotary load caused at installing a filter.
  The front group is driven with a double helicoid and the rear group is driven with a cam ring. Focusing is performed by advancing the front group. (Fig. 3)
- The Front Cover Unit consists of the Zoom Ring, which incorporates the Main Switch and is operated for zooming, the Aperture Ring for aperture stop - down, the actuator of the Main Switch and the clicks enabling the user to feel the setting of an aperture value.
- The Position Detector Unit consists of the PC board which carries a position detector contact connected to the Zoom Ring and Aperture Ring and a slide resistor.

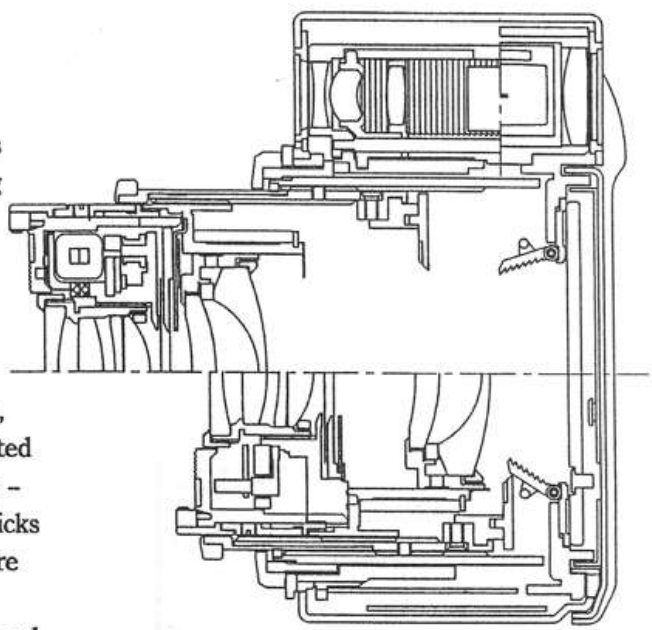


Fig.2 Cross Section of Lens Barrel

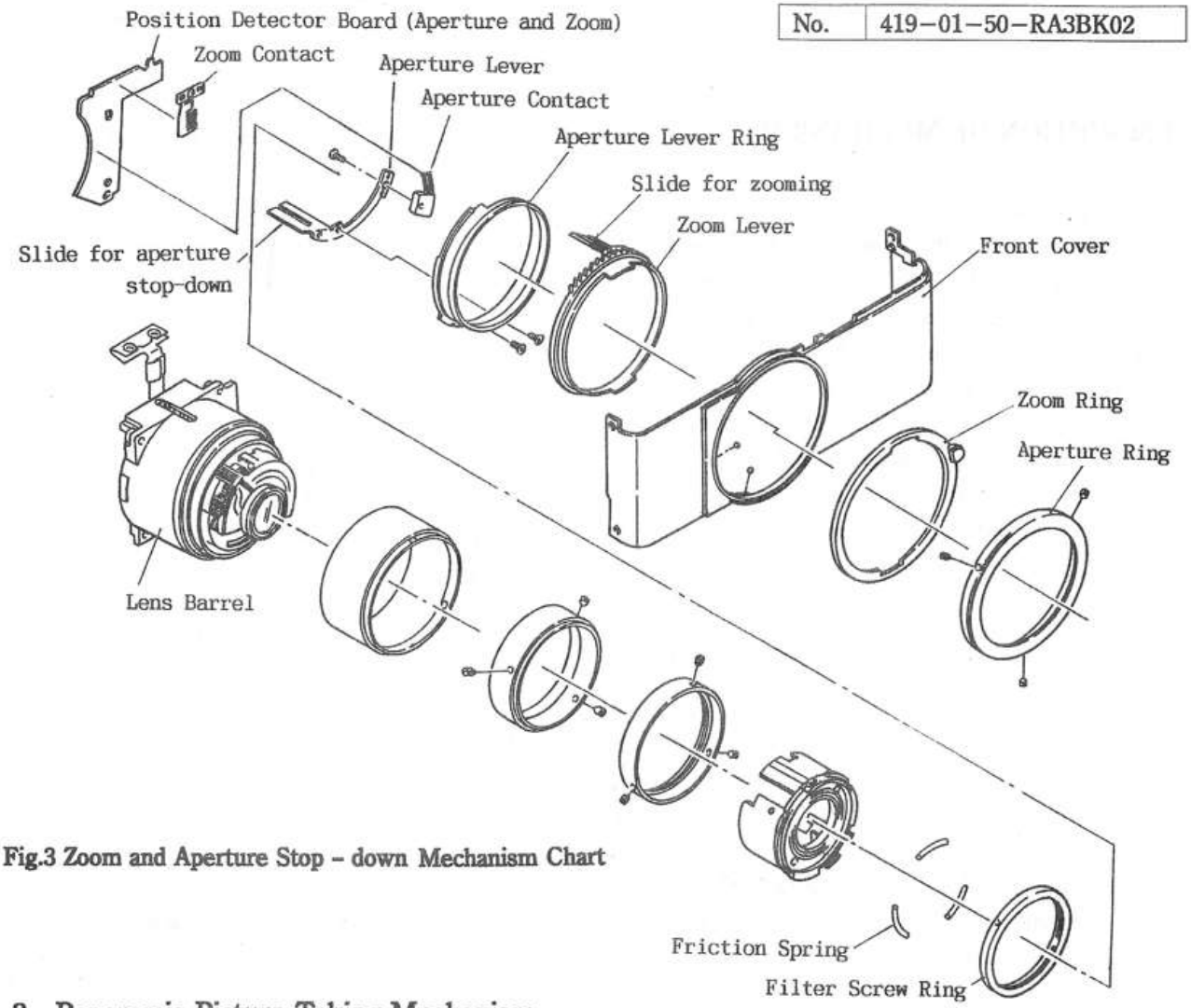


Fig.3 Zoom and Aperture Stop - down Mechanism Chart

3. Panoramic Picture Taking Mechanism

The panoramic picture taking mechanism consists of ① Light - shield Unit, ② Slide Plate Unit and ③ Changeover Lever Unit.

In linkage with the Panorama Setting Switch, the Slide Plate slides up and down, the Light - shield Plate (Upper) moves in the same direction as the Slide Plate by the action of coil springs and the Light - shield Plate (Lower) moves in the opposite direction because of the principles of the lever and fulcrum. At the same time, the leaf switch is operated to display a panoramic picture frame in the viewfinder. (Fig. 4)

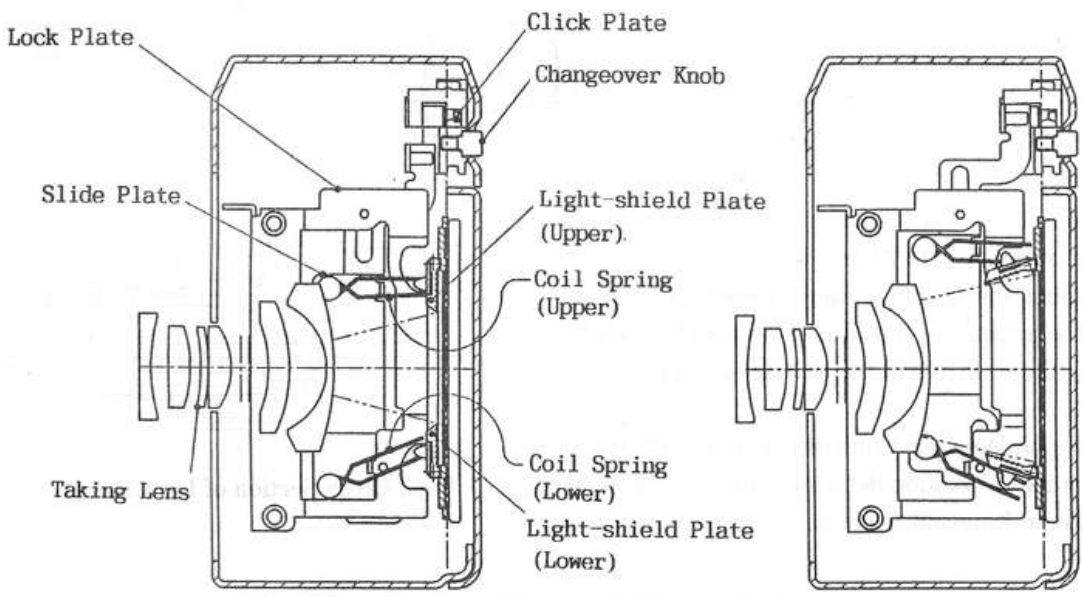


Fig.4 Cross Section of Panoramic Picture Taking Mechanism

4. Film Transport Mechanism

In the forward or reverse run of the high - performance precision motor, the position of the Epicyclic Lever is switched and winding or rewinding is performed by the operation of the Spool and Cartridge Fork. In the speed reduction mechanism, a differential gear is used instead of the conventional spur gear train.

To control film transport, the movement of perforations is directly detected with a reflection type photo - interrupter.

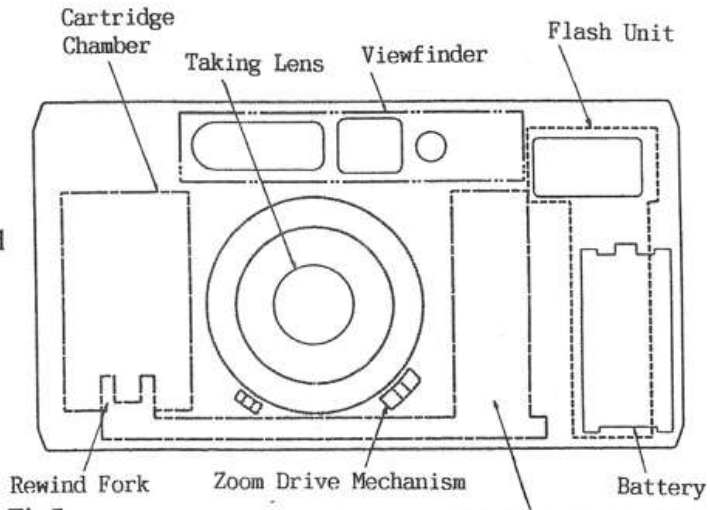


Fig.5

5. Viewfinder

The viewfinder is a real - image zoom type, which assures accurate framing . The optical system of the viewfinder consists of three objective lenses, two condenser lens situated before and behind the viewfinder LCD, six eyepieces, a glass mirror and a glass pentaprism. (Fig. 6)

To prevent flare and ghost caused by the light coming in the viewfinder, five aspherical lenses are used as four elements of the objective system and the eyepiece. And the major surfaces are coated properly and the reflection surfaces of the glass mirror and glass pentaprism are provided with a silver evaporated coating. Multi - crystal sapphire, outstanding in durability, is used as the material for the objective window and eyepiece window. A transmissible LCD is employed to display necessary information in the viewfinder.

This LCD displays not only some photographic information in the field of view but also information below the field of view. (Fig. 7)

In the field of view, the LCD displays a total of six frames including panoramic and close - up compensation frames. When the Main Switch is turned off, the LCD masks the field of view completely and displays "OFF" mark. On the display below the field of view, the LCD displays a exposure compensation sign, focus indicator, shutter speeds, etc., which are illuminated with an LED.

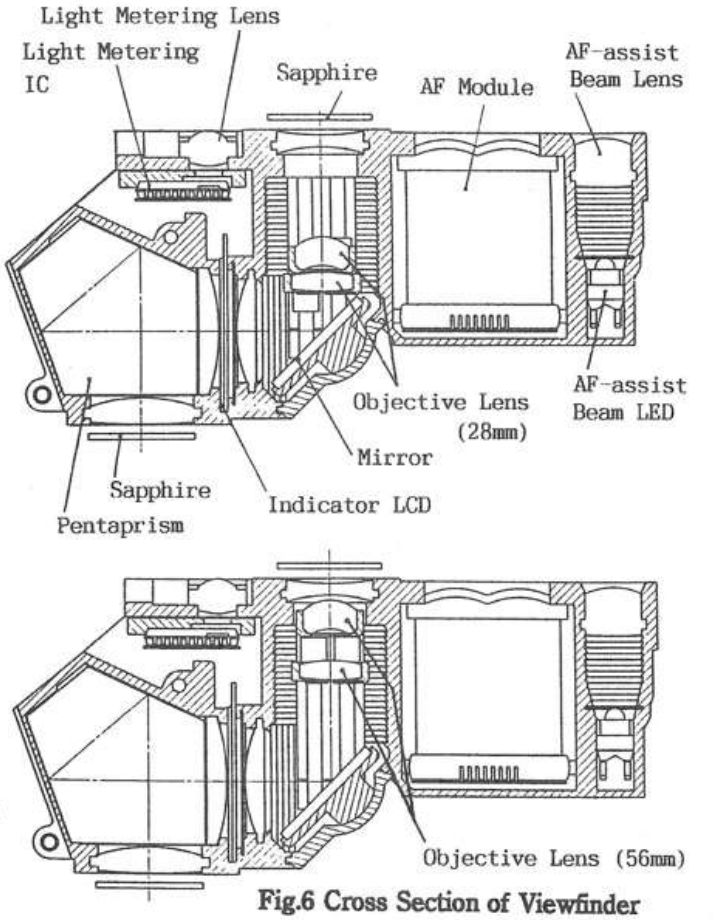
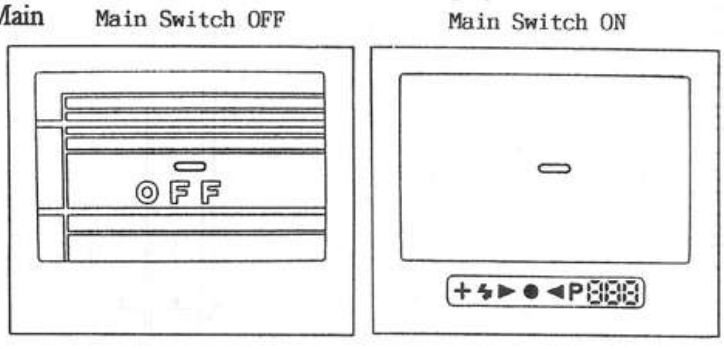
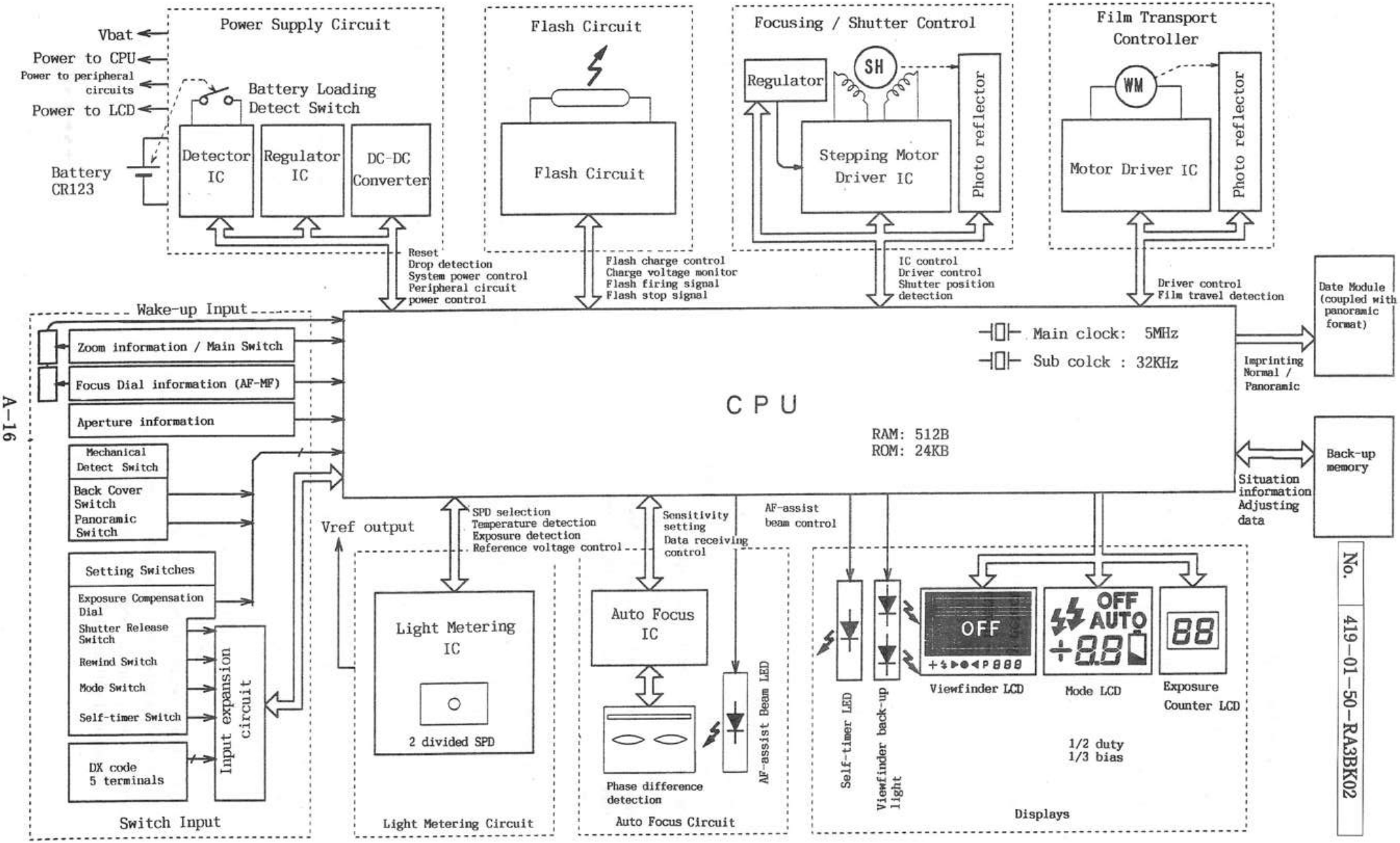


Fig.6 Cross Section of Viewfinder

Fig.7 Viewfinder Display

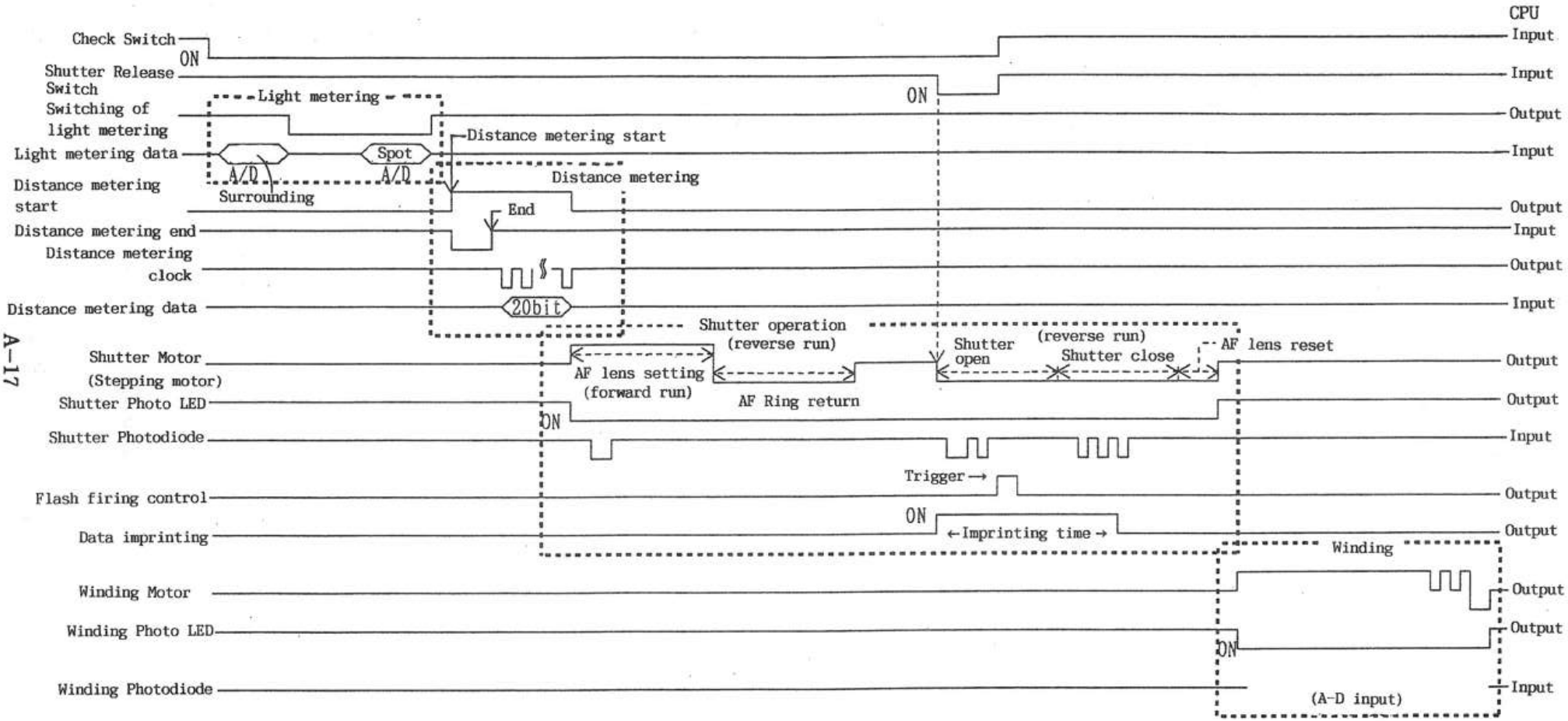


CIRCUIT BLOCK DIAGRAM



No. 419-01-50-RA3BK02

TIMING CHART



[DESCRIPTION OF ELECTRIC CIRCUITRY]

1. Power Supply Circuit

- 1. Outline

The power supply circuit outputs five system power voltages under control of IC101. At a voltage drop, IC101 is reset by hardware.

- 2. Description of Power Lines

・ Vcc: Power to CPU. 3V system ⟷ 5 V

Supplied to:	IC101 (CPU), Focus Dial, Zoom Ring, Back Cover, Panoramic and Exposure Compensation Switches (pull - up), IC802, IC803

At the start of the camera operation, IC101 turns POW0 "L" so that IC201 becomes active and starts boosting the switching voltage. IC201 boosts the voltage at the pin 6 to 5.5V and outputs 5V (Vcc) at the pin 5 through the internal series regulator.
At the setting of standby mode, IC101 turns on POW0 "H" so that IC201 stops switching operation and the camera enters the state of low power consumption. In this state, the battery voltage is supplied to the Vcc terminal through the Schottky diode in Q201 and the above - mentioned series regulator. Therefore, Vcc is almost equal to the battery voltage (3V system).

・ Vdd: Power to peripheral circuits. OFF (0V) ⟷ 5V

Supplied to:	IC401 (Shutter driver), PC501 (Winding photo coupler), IC601 (Light metering IC), IC701 (Distance metering IC), IC801 (EEPROM), Viewfinder back - up light

At the start of the camera operation, after completion (judged by the Vdchk terminal) of Vcc boosting as mentioned above, IC101 turns POW1 "L" so that Q202 is turned on and 5V is supplied to the Vdd line.
At the setting of standby mode, IC101, turns POW1 "H" so that the Vdd line is turned off.

・ V1cd: Reference voltage for charge pump circuit for LCD drive. 2.3V

Supplied to:	IC101

V1cd is generated from Vcc by the operation of IC203 (series regulator). It is boosted by three times through the charge pump circuit in IC101 and used in the LCD drive circuit.
(1 / 3 bias, 1 / 2 duty)

・ Vref: Reference voltage for A / D conversion. OFF (0V) ⟷ 3.5V

Supplied to:	IC101

Vref is generated from Vdd by the operation of the series regulator in IC601. It is used as a reference voltage for A / D conversion.

・ Vref2: Reference voltage for A / D conversion. OFF (0V) ⟷ 3.5V

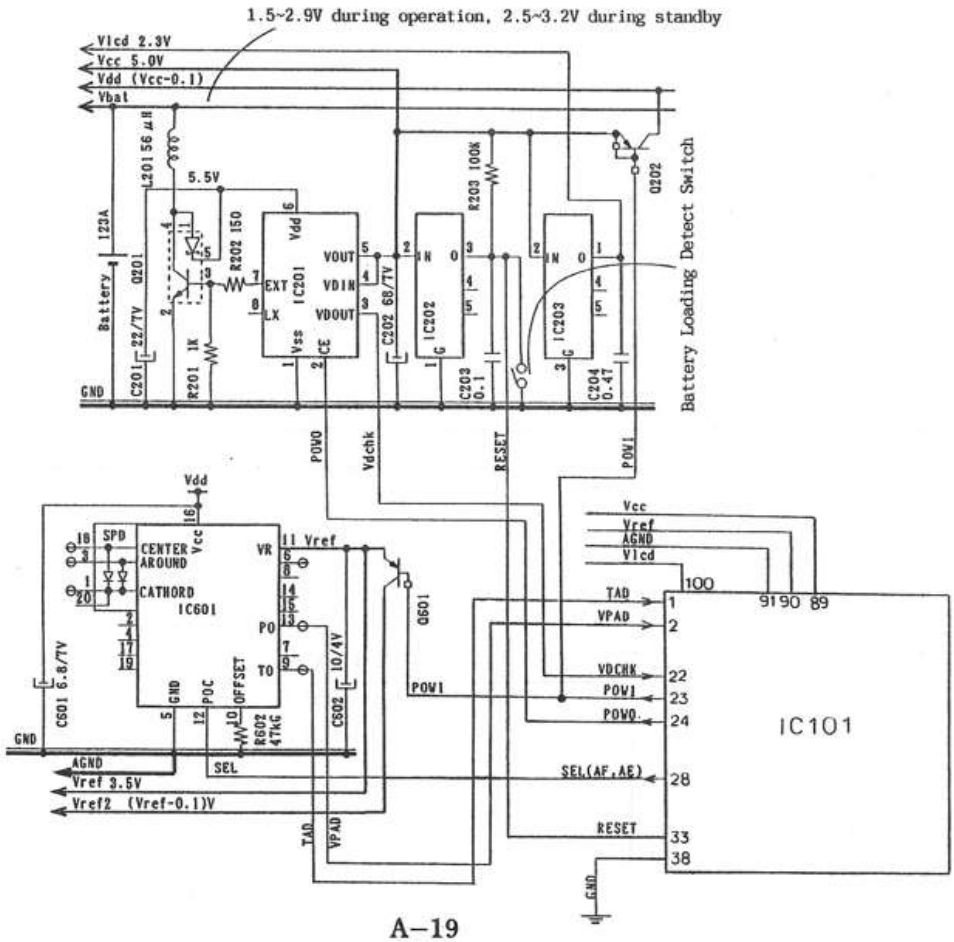
Supplied to:	PC501, Focus Dial, Zoom Ring, Aperture Ring

Vref2 is generated from Vref by the operation of Q601. At the transition to standby mode, this voltage is sharply turned off by Q601 to prevent any malfunction due to transient response delay by the capacitance. Q601 is controlled by POW1 of IC101.

- 3. Control Terminals

- Vdchk: Checks Vcc voltage. When Vcc has dropped to 4.5V or below, this terminal turns "L" and communicates with IC101.
  This terminal is used to control power transition (detect completion of Vcc boosting and control turning on of Vdd) and to constitute a protective circuit (prevent the runaway of CPU at Vcc drop).
  The protective circuit not only turns off flash charge control at Vcc drop during flash charge but also stops the camera operation forcedly at Vcc drop during normal operation.
- RESET: Checks Vcc voltage. When Vcc has dropped to 2.5V or below, this terminal turns "L" and resets IC101 forcedly from outside.
- POW0: Controls voltage boosting for IC201 switching.
  At the start from standby mode, IC101 turns POW0 "L" and starts boosting the voltage Vcc from 3V system to 5V.
- POW1: Controls power (Vdd) to the peripheral circuits, the reference voltages for A / D conversion (Vref, Vref 2) and the analog switches (for dial separation during operation; IC802 and IC803). After completion of Vcc boosting, IC101 turns POW1 "L" and turns on power to the peripheral circuits. At the same time, it turns off the analog switches to prevent the voltage of the slide resistors to pin 15, 16 of IC101 caused. At the setting of standby mode, the analog switches are turned on and the charges in the positions of the Focus Dial and Zoom Ring are monitored by interruption.

- 4. Circuit Diagram



2. Flash Circuit

- 1. Outline

The flash circuit controls flash (GNo. control and red - eye reduction pre - flash).
This circuit incorporates an overcharge prevention circuit.

- 2. Description of Terminals (I / O designated on flash circuit)

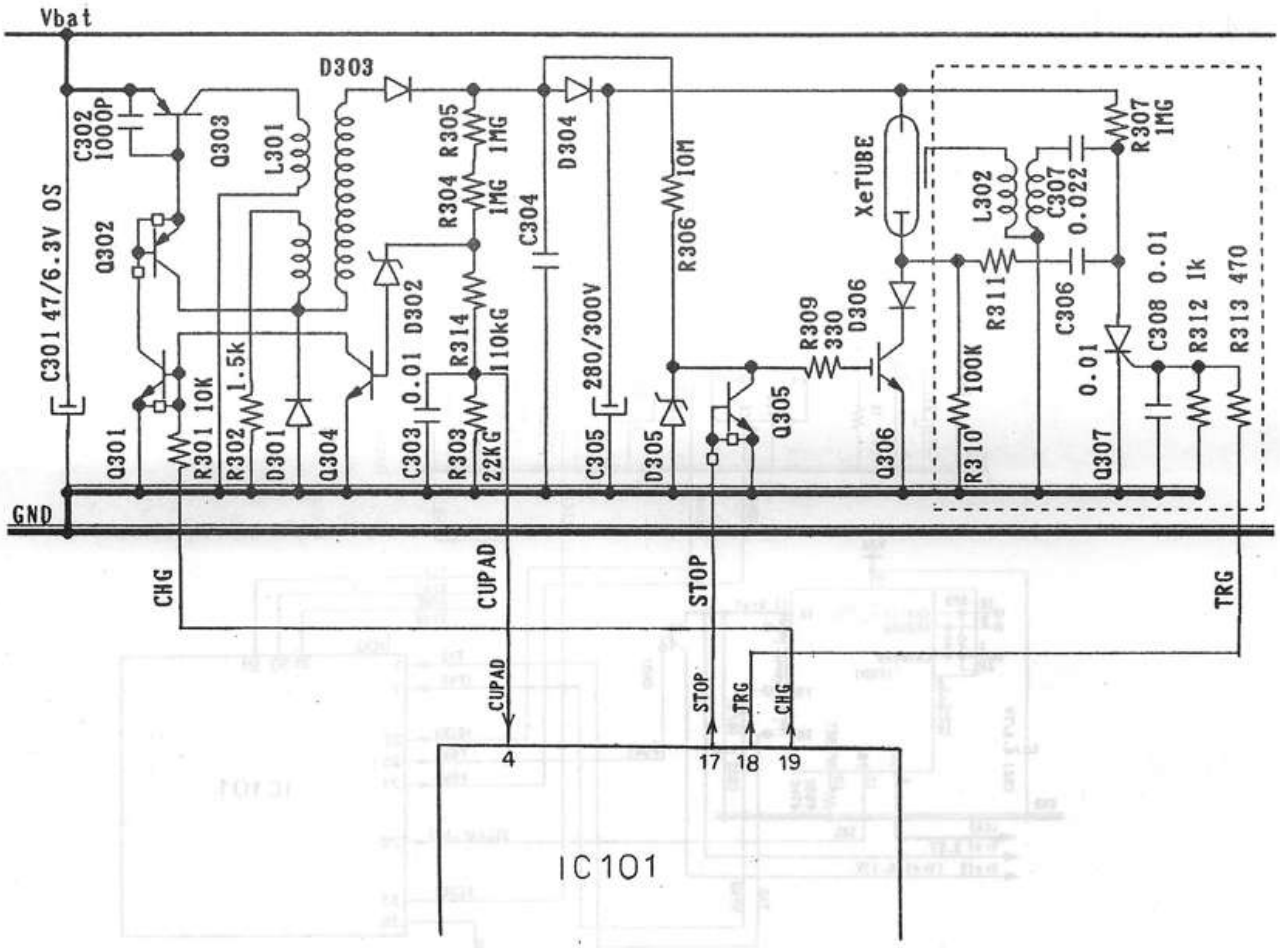
Terminal Name	Function	I / O	Description
CHG	Flash charge control	I	"H" : activates oscillation circuit and charges main capacitor.
CUPAD	Checking of main capacitor voltage	Analog output	Has IC101 monitor charge voltage of main capacitor and stops charging at 3.0V.
TRG	Flash trigger	I	"H" : Flash fires.
STOP	Flash stop	I	"H" : Flash stops.

- 3. Supplement

Generation of gate voltage: Immediately before flash firing, the circuit always performs pre - charge (10ms) to generate 12V for driving Q306.

Checking of charge voltage: The circuit always performs pre - charge immediately before checking the main capacitor voltage.

- 4. Circuit Diagram



- 5. Flash Charge Circuit

Conditions of charge start

- Main Switch ON
- PH - ON operation (Check Switch, Shutter Release Switch, Zoom Switch, Back Cover Switch, Flash Mode Switch or Focus Dial Switch ON)

When the charge control signal (CHG signal) "H" is output at the pin 19 of IC101, Q301 and Q302 turn on. Then the oscillation transformer starts oscillating. The high voltage generated on the secondary side is rectified by the diodes D303 and D304 and charges the main capacitor C305.

- 6. Charge Voltage Monitor Circuit (Charge Stop Circuit)

C304 is also charged when the main capacitor C305 is charged. The voltage of C304 (smoothing capaci - tor) is divided by R303, R314, R304 and R305 and input at the pin 4 (CUPAAD) of IC101. IC101 always monitors the voltage at the pin 4 during flash charge. The voltage at the pin 4 becomes 3V when the voltage of the main capacitor has reached about 285V. At this point, IC101 detects the completion of flash charge. Then it stops outputting the CHG signal at its pin 19 and stops charging the flash.
The charge voltage monitor voltage (CUPAD) is generated only during charge. (The CUPAD voltage is not generated after the stop of charge.)

- 7. Protective Circuit

When the charge voltage has exceeded 330V, the protective circuit stops flash charging forcedly.
This circuit operates if IC101 can not stop charging for some trouble.
When the main capacitor C305 has been charged to about 330V, a current flows in D302 (flash overcharge detector). Consequently, Q301 turns off and then Q302 turns off to stop charge oscillation by hardware.

- 8. Flash Charge Check Circuit

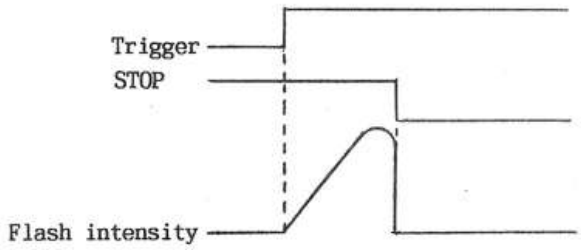
After the stop of falsh charge, the main capacitor discharge spontaneously and thus its voltage lowers slowly. The flash charge circuit starts operating when the voltage of the main capacitor has dropped to about 260V.
Flash charge check is performed when the PH is turned off 8 sec after the turning on of the Main Switch and then turned on by a PH - on operation. At flash charge check, C304 is charged for 10 msec and the voltage of the CUPAD terminal is monitored. Charging is started if the charge voltage of the main ca - pacitor is low.

- 9. Flash Firing Circuit

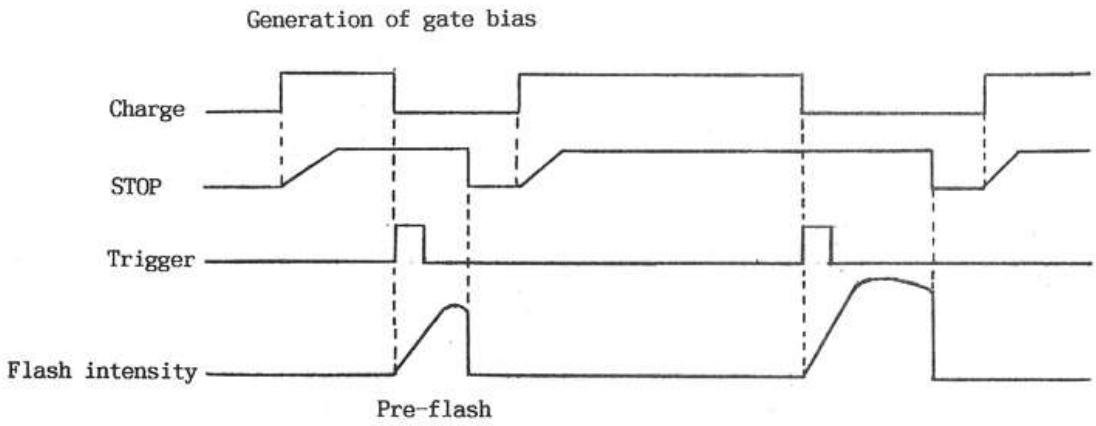
Conditions of flash firing

- In program AE mode, light metering shows that the shutter speed without flash will be slower than 1 / 60.
- There is a bright backlight: Light metering value of center +1EV < Light metering value of surrounding portion
- Fill - in flash mode (⚡) is set.

At the turning on of the Shutter Release Switch, pre - charge is performed for 10 msec immediately before the start of the shutter sequence. This pre - charge generates 12V at D305 and turns on Q306. The thyristor Q307 turns on when the flash firing signal (TRG) turns "H" at the pin 18 of IC101. As a result, a trigger voltage is generated and applied to the xenon tube for flashing.
For GNo. control and red - eye reduction pre - flash, the STOP signal is output to control flash intensity.



- 10. Pre - flash Sequence



3. Shutter Circuit

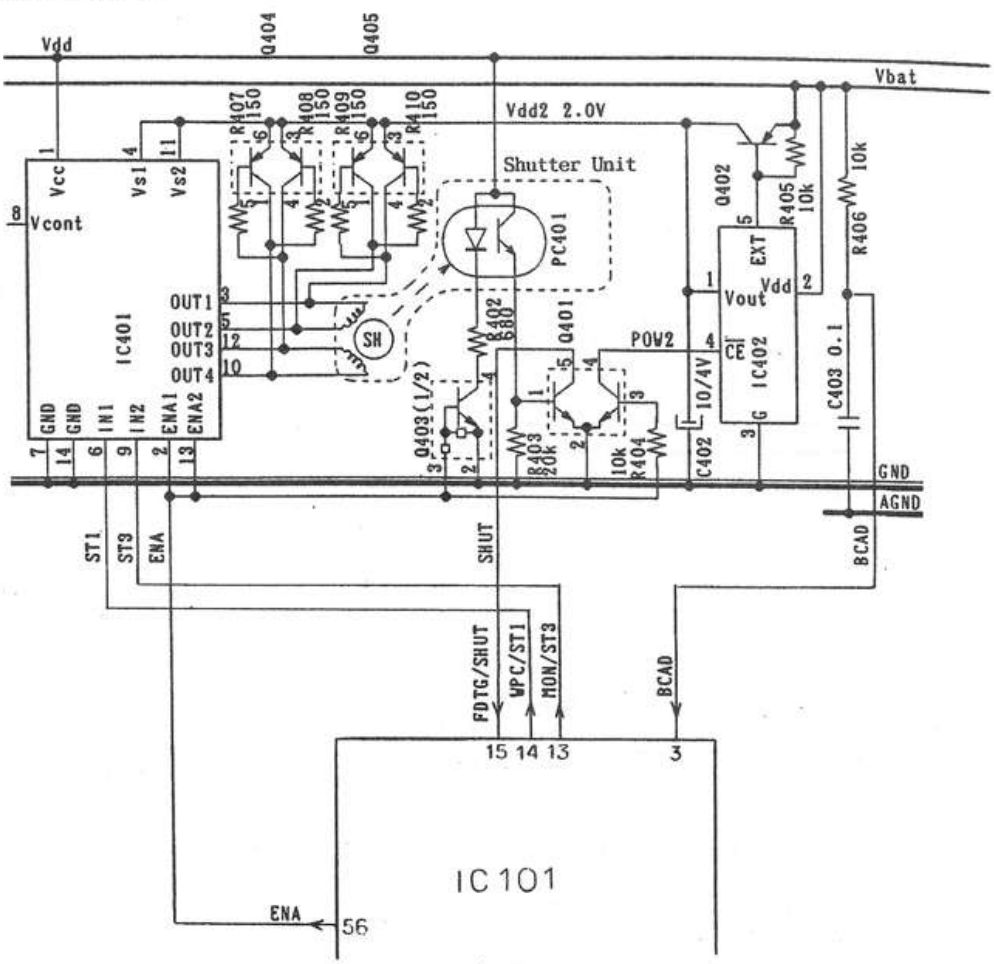
- 1. Outline

- This circuit controls focusing and shutter operation by controlling the forward or reverse run of the 2 - phase excited stepping motor.
- The circuit generates a regulated voltage of 2.0V to drive the motor.
- A photo coupler detects the position of the shutter blades and a transistor corrects the waveform.
- With the shutter as a load, the circuit outputs a battery check voltage.

- 2. Description of Control Terminals (I / O designated on shutter circuit)

Terminal Name	Function	I / O	Description
ST1	Shutter driver control terminal	I	Controls stepping motor by combinations as (0, 0), (0, 1), (1, 1) and (1, 0). Forward: focusing Reverse: shutter operation
ST2		I	
ENA	Turing on driver	I	"H": turns on 2.0V for drive, turns on driver and photo coupler LED.
SHUT	Blade position output	O	Checks initial blade position and starts AE timer and AF timer.
BCAD	Battery check output	Analog output	With shutter as load (400mA), check result is output through filter to IC101.

- 3. Circuit Diagram



4. Winding Circuit

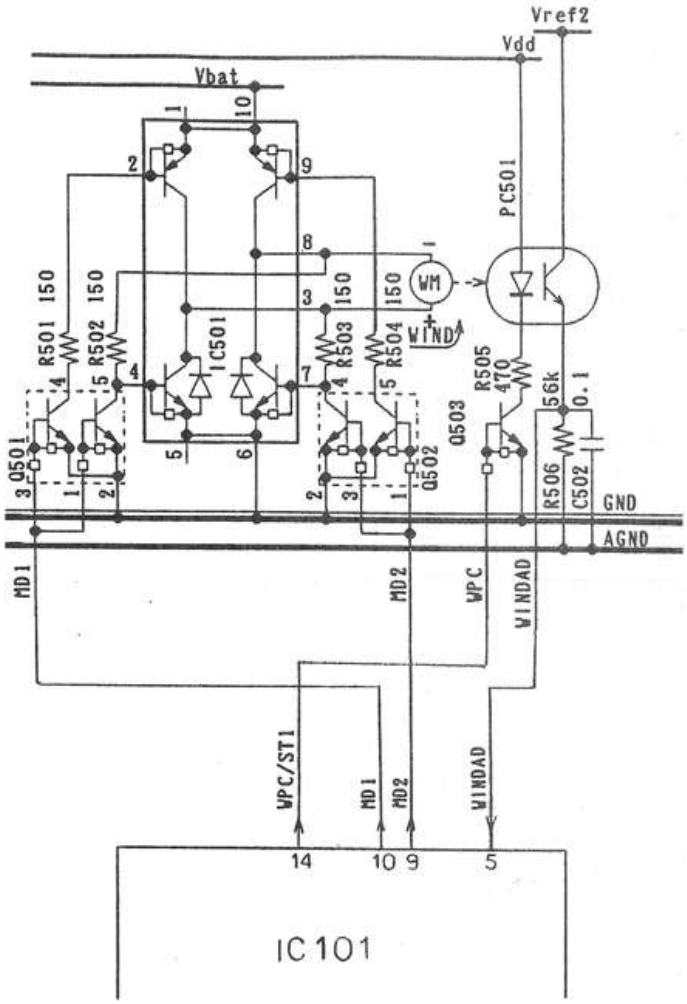
- 1. Outline

- The winding circuit controls the winding and rewinding of the film by running the Winding DC Motor forward or reversing it.
- The circuit detects perforations of the film directly with a photo coupler and outputs an analog waveform.

- 2. Description of Control Terminals (I / O designated on winding circuit)

Terminal Name	Function	I / O	Description
MD1	DC motor driver control terminal	I	Controls running of DC motor and controls film transport. MD1="H" : forward run, winding MD2="H" : reverse run, rewind
MD2		I	
WPC	Switch of photo coupler for winding	I	"H" at winding : turns on photo coupler and monitors WINDAD output.
WINDAD	Analog output of film travel	Analog output	Outputs analog voltage of perforations for reading and control by IC101.

- 3. Circuit Diagram



5. Light Metering Circuit

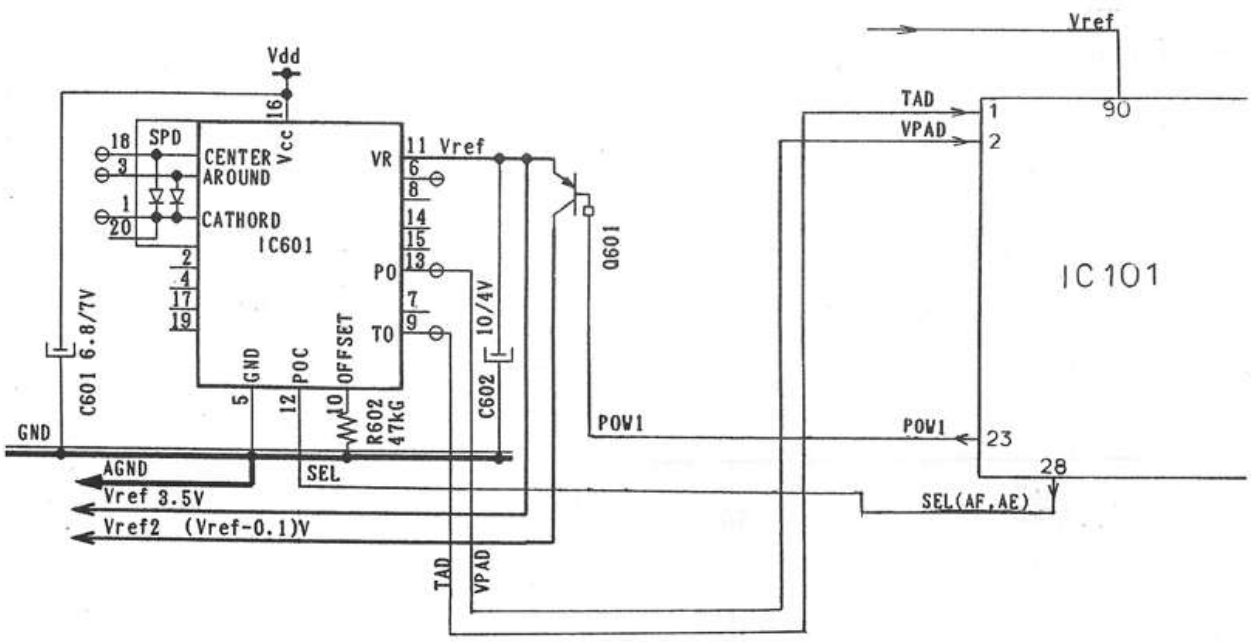
- 1. Outline

- Light metering output: The light metering circuit logarithmically compresses the photocurrent of the SPD and converts it to a voltage linear to the EV value.
- Temperature dependence: Since light metering output is dependent on temperature, IC101 compensates for the difference in the light metering output due to temperature. For this compensation, IC601 outputs the necessary temperature data in the form of voltage.
- 2 - divided light metering: The circuit incorporates two SPDs — one for the center divided and the other for the surrounding divided. Light metering is switched between the two divides and data of the two are output. The data are used for backlight compensation or automatic flash firing.

- 2. Description of Control Terminals (I / O designated on light metering circuit)

Terminal Name	Function	I / O	Description
SEL	Light metering SPD select signal	I	Switches light metering between center SPD and surrounding SPD. "L" : surrounding, "H" : center
POW1	Vref 2 power control	I	Turns on / off Vref2 (reference voltage for A / D conversion on peripheral circuit side). "H" : OFF, "L" : ON
VPAD	Light metering output	Analog output	Outputs voltage according to brightness.
TAD	Temperature sensor output	Analog output	Outputs voltage linear to temperature.

- 3. Circuit Diagram



6. Auto Focus Circuit

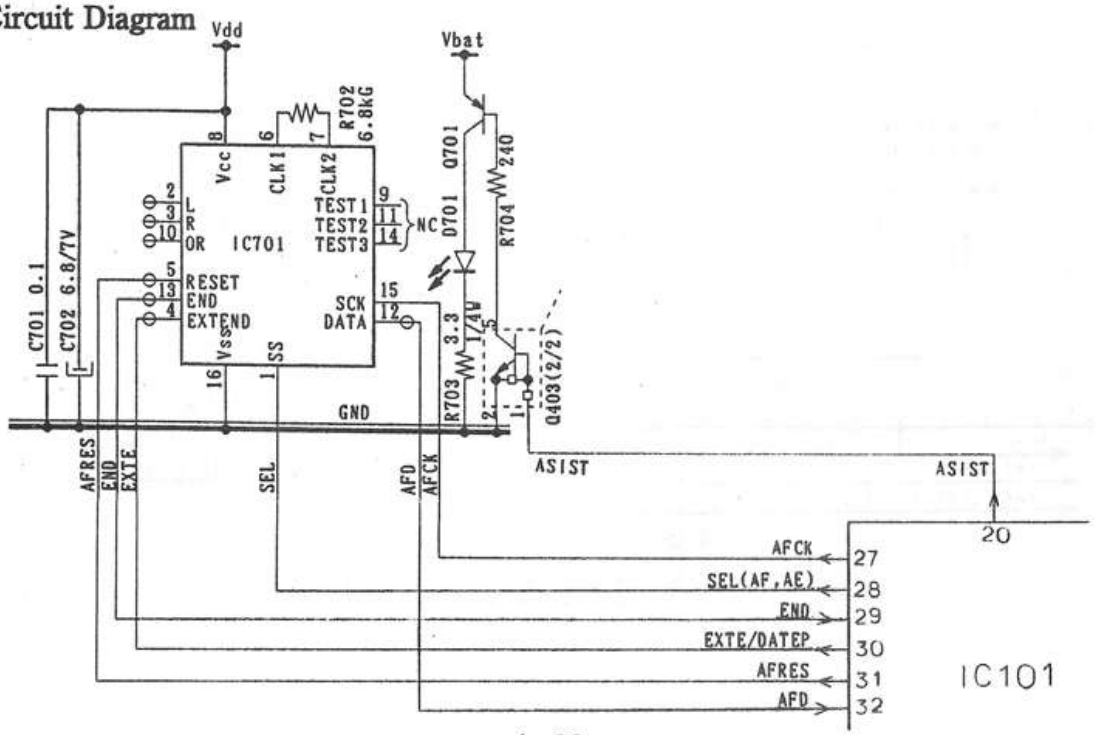
- 1. Outline

- Auto Focus: External passive system
- After completion of accumulation operation, this circuit outputs data read by serial communication.
- In the dark or in low contrast situations, an AF - assist beam is emitted to enhance the AF detection accuracy.
- Sensitivity switching: The sensor sensitivity is switched according to brightness to minimize distortion and improve response time.

- 2. Description of Control Terminals (I / O designated on Auto focus circuit)

Terminal Name	Function	I / O	Description
SEL	Sensor sensitivity select signal	I	Switches sensor sensitivity between high and low. "L" : surrounding, "H" : center
AFRES	AF focusing start signal	I	"L" : reset "H" : starts AF focusing at rise (accumulation start)
EXTE	Signal for externally forced stop of accumulation	I	Stops accumulation forcedly when it has not been completed in a certain time.
END	Arithmetic operation end signal	O	Outputs "H" when IC has completed AF focusing operation.
AFCK	Serial lock	I	Outputs clock to be used when IC101 reads AF data from AF IC.
AFD	AF data	O	Outputs AF data to IC101 in synchronization with AFCK.
ASIST	AF - assist beam emit signal	I	"H" : emits AF - assist beam in EV4 and below or low contrast situations.

- 3. Circuit Diagram



7. Input Switches (1) (Expansion Circuit)

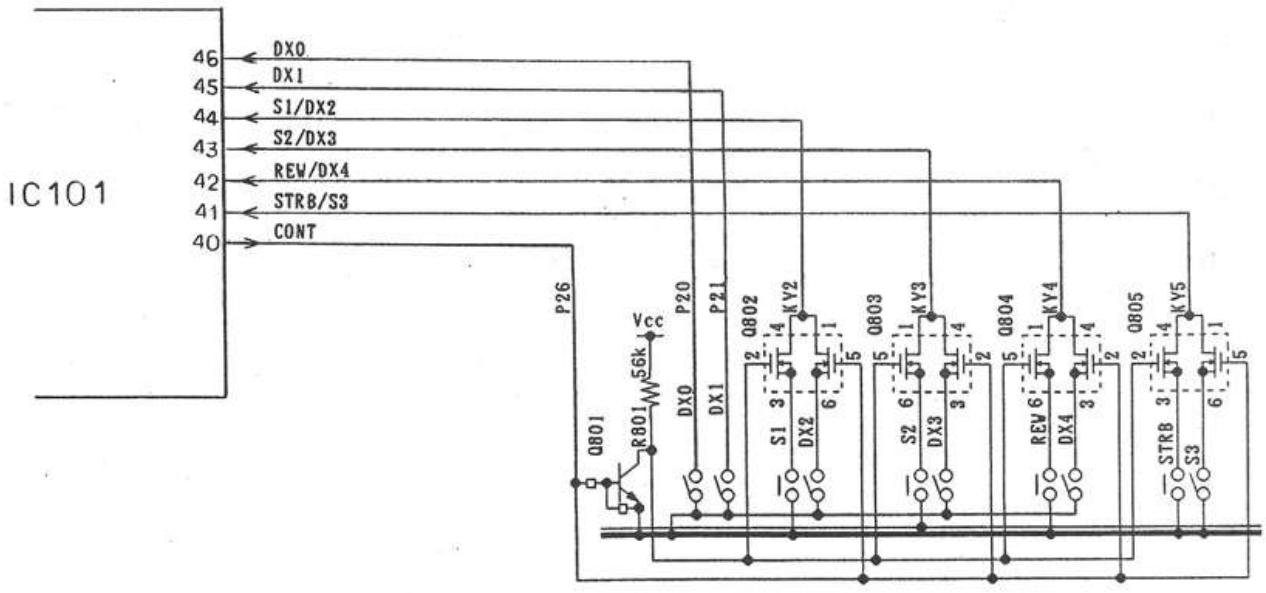
- 1. Outline

- The MOS transistors allows additional four inputs. (DX2 ~ 4 and Self - timer Switch)
- In standby mode, the transistor for switching MOS transistors are turned off and the switches on the wake - up operation side of IC101 are selected.

- 2. Description of Control Terminals (I / O designated on IC101)

Terminal Name		I/O	Active	Function	Description
040	CONT	O	-	Matrix input select switch	"L" : Shutter Release 1, 2 , Rewind and Mode Switches "H" : DX2, DX3, DX4 and Self - timer Switches
041	STRB/	I	L	Flash mode switch	Selects flash mode.
	S3	I	L	Self - timer switch	Selects switch for shooting with self - timer
042	REW/	I	L	Mid - roll rewind switch	
	DX4	I	L	DX contact 4	
043	S2	I	L	Shutter release 2 switch	Shutter release
	DX3	I	L	DX contact 3	
044	S1	I	L	Shutter release 1 switch	Light metering and auto focusing lock
	DX2	I	L	DX contact 2	
045	DX1	I	L	DX contact 1	
046	DX0	I	L	DX contact 0	

- 3. Circuit Diagram



8. Input Switches (2) (A / D Input, Wake - up Circuit)

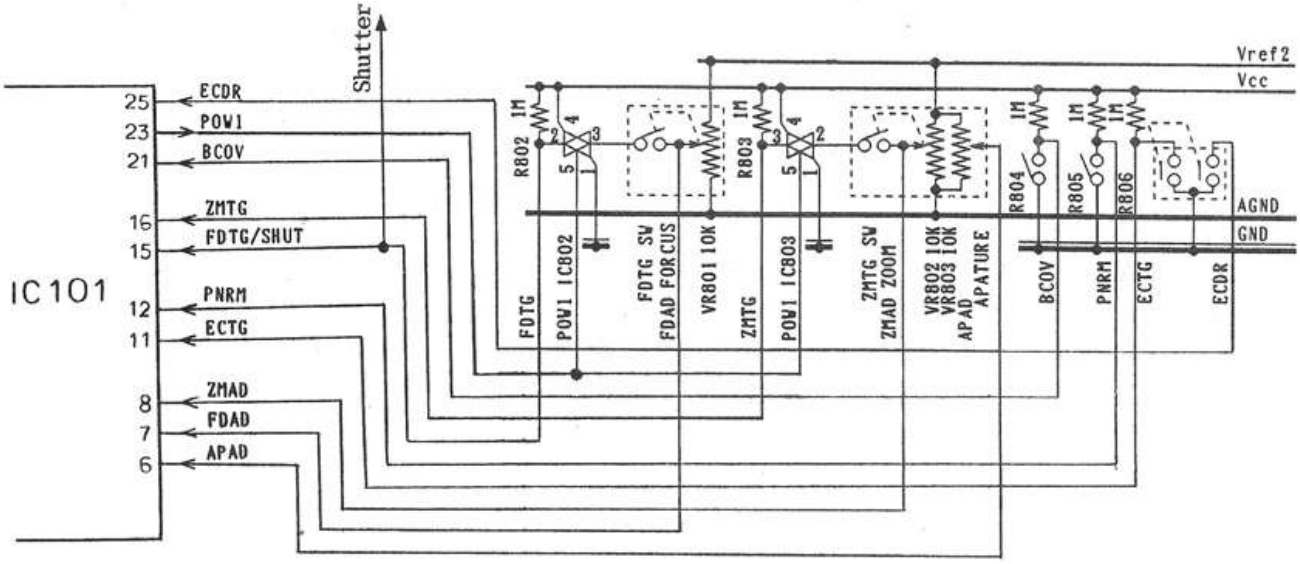
- 1. Outline

- The Zoom Ring and Focus Dial measure the voltage from the brushes on the slide resisters and detect the respective setting positions.
- For start by the turning of the Zoom Ring and Focus Dial, the signal from the pattern of comb shaped teeth coupled mechanically with each slide resistor interrupts IC101.
- The analog switches (IC802 and 803) cut off the voltage of the slide resistors to Pin 15, 16 of IC101 caused during operation of Zoom Ring and Focus Dial.
- The Exposure Compensation Dial detects the direction of turning and the amount of turning from the patterns of tow signals (ECTG and ECDR).
- Since both edges are to be detected during standby, a large resistance (1 M Ω) has been set for pull - up and the standby current has been minimized.

- 2. Description of Terminals (I / O designated on IC101)

Terminal Name	Function	I / O	Description
BCOV	Back Cover open / close detect switch	I	Open : switch ON = "L" Close : switch OFF = "H"
PNRM	Panoramic switch	I	Panorama ON = "L" Normal = "H"
ECTG	Exposure compen - sation switch	I	Both signals are at "H" for mechanical click position. Direction of turning is detected by ECDR pattern at change of ECTG pattern.
ECDR	Exposure compen - sation switch	I	
POW1	Peripheral power control terminal	O	Controls analog switches. Close at "H" during standby : detects turning of Zoom Ring and Focus Dial. Open at "L" during operation : cuts off voltage of slide resistors to Pin 15, 16 of IC101 caused.
ZMTG	Zoom position detect switch	I	Outputs pulse in linkage with turning of Zoom Ring. Starts operation.
FDTG	FD position detect switch	I	Outputs pulse in linkage with turning of Focus Dial. Starts operation.
APAD	Aperture setting analog voltage	Analog input	Detects aperture setting value as voltage.
ZMAD	Zoom setting analog voltage	Analog input	Detects zoom setting value as voltage.
FDAD	FD setting analog voltage	Analog input	Detects FD setting value as voltage.

- 3. Circuit Diagram



[DESCRIPTION OF FUNCTIONS OF IC TERMINALS]

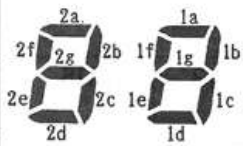
IC101 (CPU), 100 pins

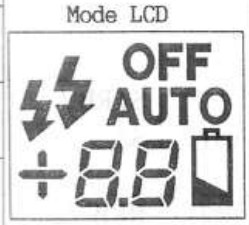
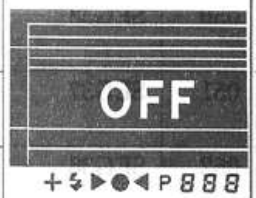
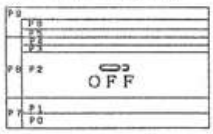
Pin No.	Symbol	I/O A/D	Active derec - tion	Functions	Description
001	TAD	A/D	-	Detection of temperature sensor output	+17.8mV/ °C , 1550mV TYP (at 25 °C) Corrects results of light metering, AF focusing and battery check.
002	VPAD	A/D	-	Detection of light metering output	−128mV/Ev, center 1450mV, surrounding 1030mV TYP (at 20 °C) Detects light metering out - put of center / surrounding area.
003	BCAD	A/D	-	Detection of remaining life of battery	Decides remaining life with 400mA as load.
004	CUPAD	A/D	-	Detection of flash charge voltage	Detects flash charge voltage during charge.
005	WINDAD	A/D	-	Detection of film travel	Detects film travel by converting reflected light at perforations to voltage and controls film transport.
006	APAD	A/D	-	Detection of Aperture Ring setting value	Detects program /aperture setting value as voltage. P: 437.5mV ~ F16: 3062.5mV TYP
007	FDAD	A/D	-	Detection of Focus Dial setting value	Detects AF - MF distance setting value as voltage. AF:231.3mV, ∞ : 647.6mV ~ 0.5m : 3114.5mV TYP
008	ZMAD	A/D	-	Detection of Zoom Ring setting value	Detects Main Switch / focal length setting as voltage. OFF: 296.3mV, WIDE : 1266.7mV ~ TELE : 3211.1mV TYP
009	MD2	O	H	Control of winding motor driver	(MD1, MD2) : (1,0) = foward (0,1) = reverse (0,0) = standby (1,1) = electric brake Forward = winding Reverse = rewind
010	MD1	O	H	Control of winding motor driver	
011	ECTG	I	⌐/¬	Exposure compensation timing switch	Outputs ± for exposure compen - sation value at fall or rise timing according to position of direction detect switch.
012	PNRM	I	L	Detection of Panoramic setting	Panoramic setting = "L" Normal setting = "H"

Pin No.	Symbol	I/O A/D	Active direc - tion	Functions	Description
013	ST3	O	H / L	Shutter driver control	Stepping ← Shutter AF → motor control setting control
014	ST1 /	O	H / L	Shutter driver control	ST1 | 0 | 0 | 1 | 1 | 0 | ST3 | 0 | 1 | 1 | 0 | 0 |
	WPC	O	H	Winding photo - coupler switch	Turns on LED to detect travel at winding control.
015	SHUT /	I	↓	Detection of shutter blade position	1st fall : AE timer 2nd fall : FM timer
	FDTG	I	↓/↑	Start by Focus Dial	Pulse signal generated by turning of Focus Dial. At its edge, CPU starts from standby.
016	ZMTG	I	↓/↑	Start by Zoom Ring	Pulse signal generated by turning of Zoom Ring. At its edge, CPU starts from standby.
017	STOP	O	H	Flash stop signal	Stops flash by outputting "H" during flashing.
018	TRG	O	H	Flash firing trigger	"H" : generates firing trigger voltage at Xenon tube.
019	CHG	O	H	Flash charge control signal	"H" : charges flash. "L" : stops flash charge.
020	ASIST	O	H	Control of AF - assist beam emission	"H" : emits AF - assist beam. 200msec max.
021	BCOV	I	L	Detection of Back Cover open / close	"L" : open, "H" : close
022	VDCHK	I	L	Detection of Vcc voltage	Turns "L" at drop of Vcc voltage to 4.5V or below. Detects completion of voltage boosting. Detects drop during operation and prevents runaway of CPU.
023	POW1	O	L	Peripheral circuit power switch	Turns on transistor after com - pletion of voltage boosting to supply power to peripheral circuits. Turns on analog switches on FD and ZM boards at setting of standby to make starting switches active.
024	POW0	O	L	System power switch	Sets switching power IC in enabled state to boost system power. 3V system → 5V

Pin No.	Symbol	I/O A/D	Active direc - tion	Functions	Description
025	ECDR	I	-	Switch for detecting di - rection of exposure compensation turning	See description of pin 11 (exposure compensation switch) ← - direction + direction → ECTG 1 0 0 1 1 ECDR 1 1 0 0 1 (1, 1) = mechanical click position
026	DATEX	O	H	Date imprinting signal	During "H" : keeps lamp lit and imprints date.
027	AFCK /	O	-	AFIC data read clock	Data change at rise
	SCK	O	-	EEPROM serial communication clock	Clock of micro wire type (3 wires)
028	SEL (AF)	O	-	Selection of AFIC focusing sensitivity	"H" : low sensitivity "L" : high sensitivity
	SEL (AE)	O	-	Selection of AEIC center / surrounding	"H" : center "L" : surrounding
	SO	O	-	EEPROM serial communication data output	Output data of micro wire type (3 wires)
029	END /	I	H	Signal of focusing operation end	Rises upon completion of arithmetic operation and starts reading data.
	SIN	I	-	EEPROM serial communication data input	Input data of micro wire type (3 wires)
030	EXTE /	O	L	Signal for forced end of focusing accumulation	Detects Main Switch / focal length setting as voltage.
	DATEP	O	H	Data imprinting switching	"H" : panoramic, "L" : normal
031	AFRES	O	L	Signal for starting focusing accumulation	Initializes AFIC at "L" and srarts accumulation at rise.
032	AFD	I	-	Focusing data input	Starts reading data at read clock after receiving END signal.
033	RESET	I	L	Reset input	Initializes CPU.
034	XCIN	I	-	Input to sub clock oscillation circuit	32 KHz oscillation
035	XCOUT	O	-	Output from sub clock oscillation circuit	32 KHz oscillation
036	XCIN	I	-	Input to main clock oscillation circuit	5 MHz oscillation
037	XCOUT	O	-	Output from main clock oscillation circuit	5 MHz oscillation
038	Vss	-	-	CPU power (GND)	
039	TEST	I	L	Automatic adjusting machine transition input	

Pin No.	Symbol	I/O A/D	Active direc - tion	Functions	Description
040	CONT	O	-	Matrix Input select switch	"L" : Shutter Release 1, 2, Rewind and Mode Switches "H" : DX2, DX3, DX4 and Self - timer Switches
	STRB /	I	L	Flash mode switch	Selects flash mode.
041	S3	I	L	Self - timer switch	Selects switch for shooting with self - timer
042	REW /	I	L	Mid - roll rewind switch	
	DX4	I	L	DX contact 4	
043	S2	I	L	Shutter release 2 switch	Shutter release
	DX3	I	L	DX contact 3	
044	S1	I	L	Shutter release 1 switch	Light metering and AF focusing lock
	DX2	I	L	DX contact 2	
045	DX1	I	L	DX contact 1	
046	DX0	I	L	DX contact 0	
047	BLGT	O	H	Backlight LED control switch	Viewfinder backlight. Lights up during power - ON.
048	SELF	O	H	Self - timer LED control switch	Blinks during self - timer operation. Blinks between pre - flash and main flash.
049	SEG39	O	-	LCD segment signal for exposure counter	COM0: 1a; COM1:
050	SEG38	O	-	LCD segment signal for exposure counter	1b; 1f
051	SEG37	O	-	LCD segment signal for exposure counter	1c; 1g
052	SEG36	O	-	LCD segment signal for exposure counter	1d; 1e
053	SEG35	O	-	LCD segment signal for exposure counter	2a;
054	SEG34	O	-	LCD segment signal for exposure counter	2b; 2f
057	SEG31	O	-	LCD segment signal for exposure counter	2c; 2g
058	SEG30	O	-	LCD segment signal for exposure counter	2d; 2e
055	ROMCS	O	H	EEPROM chip select	Makes back - up memory accessible.
056	ENA	O	H	Shutter enable signal	Operates shutter circuit.



Pin No.	Symbol	I/O A/D	Active direc - tion	Functions	Description		
059	SEG29	O	−	LCD segment signal for flash mode	COM0 2a	COM1 Decimal point	
060	SEG28	O	−	LCD segment signal for flash mode	2b	2f	Mode LCD
061	SEG27	O	−	LCD segment signal for flash mode	2c	2g	
062	SEG26	O	−	LCD segment signal for flash mode	2d	2e	
063	SEG25	O	−	LCD segment signal for flash mode	—	!	
064	SEG24	O	−	LCD segment signal for flash mode	R	L	
065	SEG23	O	−	LCD segment signal for flash mode	1a		
066	SEG22	O	−	LCD segment signal for flash mode	1b	1f	
067	SEG21	O	−	LCD segment signal for flash mode	1c	1g	
068	SEG20	O	−	LCD segment signal for flash mode	1d	1e	
069	SEG19	O	−	LCD segment signal for flash mode	AUTO	OFF	
070	SEG18	O	−	LCD segment signal for viewfinder	COM0 3g	COM1 3c	Viewfinder LCD
071	SEG17	O	−	LCD segment signal for viewfinder	2e	2d	
072	SEG16	O	−	LCD segment signal for vewfinder	2g	2c	
073	SEG15	O	−	LCD segment signal for viewfinder	1e	1d	
074	SEG14	O	−	LCD segment signal for viewfinder	1g	1c	Viewfinder parallax correction frames
075	SEG13	O	−	LCD segment signal for viewfinder	1b	1a	
076	SEG12	O	−	LCD segment signal for viewfinder	1f	2b	
077	SEG11	O	−	LCD segment signal for viewfinder	P2	P1	
078	SEG10	O	−	LCD segment signal for viewfinder	P5	P4	
079	SEG09	O	−	LCD segment signal for viewfinder	P6	P9	
080	SEG08	O	−	LCD segment signal for viewfinder	P3	P8	

Pin No.	Symbol	I/O A/D	Active direc - tion	Functions	Description		
081	SEG07	O	-	LCD segment signal for viewfinder	COM0 P0	COM1 P7	
082	SEG06	O	-	LCD segment signal for viewfinder	2f	2a	
083	SEG05	O	-	LCD segment signal for viewfinder	3b	3a	
084	SEG04	O	-	LCD segment signal for viewfinder	¦	—	
085	SEG03	O	-	LCD segment signal for viewfinder	↯	▶	
086	SEG02	O	-	LCD segment signal for viewfinder	●	◀	
087	SEG01	O	-	LCD segment signal for viewfinder	3f	P	
088	SEG00	O	-	LCD segment signal for viewfinder	3e	3d	
089	Vcc	-	-	CPU power	Power - ON : 5V Standby : battery voltage		
090	Vref	-	-	Reference voltage input for A/D conversion (3.5V)	Power - ON : 3.5V Standby : 0V		
091	AVss	-	-	Reference voltage input for A/D conversion (0V)			
092	COM3	O	-	Not used			
093	COM2	O	-	Not used			
094	COM1	O	-	Common signal for LCD lighting control	2 - division		
095	COM0	O	-	Common signal for LCD lighting control	2 - division		
096	VL3	-	-	Triple voltage boosting line for LCD charge pump	1/3 bias source for LCD lighting control (6.9V)		
097	VL2	-	-	Double voltage boosting line for LCD charge pump	1/3 bias source for LCD lighting control (4.6V)		
098	C2	-	-	Terminal 2 of LCD charge pump	Negative charge side of charge pump capacitor		
099	C1	-	-	Terminal 1 of LCD charge pump	Positive charge side of charge pump capacitor		
100	VL1	-	-	Input line of LCD charge pump	Reference input for voltage boosting (2.3V)		

IC201 (Power Supply IC), 8 pins

Pin No.	Terminal name	Signal name (CPU)	I/O A/D	Active direc - tion	Functions	Description
001	Vss	-	-	-	Power supply (GND)	
002	$\overline{CE}$	POWO	I	L	Chip enable	"L" : booster ON, "H" : booster OFF
003	VDOUT	VDCHK	O	L	Comparator output	"L" output at active Open drain output at other time
004	VDIN	-	I	-	Comparator input	Active at 4.5V or below
005	VOUT	-	-	-	Regulated DC power output (5V)	Outputs regulated DC 5V power by series regulator after voltage boosting.
006	Vdd	-	-	-	Boosted voltage out - put (5.5V)	Boosts power voltage and smoothes it by C201.
007	EXT	-	O	H	Switching transistor control terminal	Controls switching of transistor and boosts Vdd to 5.5V.
008	LX	-	O	L	Switching output	Not used

(Remarks) Pin 8 = NC

IC202 (Voltage Detection IC) , 5pins

Pin No.	Terminal name	Signal name (CPU)	I/O A/D	Active direc - tion	Functions	Description
001	Vss	-	-	-	IC power (GND)	
002	Vin	-	I	-	Power supply and com - parator input	Active at 2.5V or below input
003	Vout	RESET	O	L	Detection output (comparator)	Open drain output "L" output at active.

(Remarks) Pin 4, 5 = NC

IC203 (3 - terminal Regulator IC), 5 pins

Pin No.	Terminal name	Signal name (CPU)	I/O A/D	Active direc - tion	Functions	Description
001	Vout	-	-	-	Output of regulated DC power	2.3V output / 150mW
002	Vin	-	-	-	IC power	
003	Vss	-	-	-	IC power (GND)	

(Remarks) Pin 4, 5 = NC

IC401 (Shutter Driver IC) 14 pins

Pin No.	Terminal name	Signal name (CPU)	I/O A/D	Active direc - tion	Functions	Description
001	Vcc	-	-	-	IC power (logic)	
002	ENA1	ENA	I	H	Enable signal	"H" : makes IC operable.
003	OUT1	-	O	-	Shutter drive output 1	Applies voltage to coil with OUT2. $\overline{OUT2}$
004	Vs1	-	-	-	Driver power	Bridge power line. Inputs regulated DC 2V power from IC402.
005	OUT2	-	O	-	Shutter drive output 2	Applies voltage to coil with OUT1. $\overline{OUT1}$
006	IN1	ST1	I	H / L	Shutter control terminal 1	Controls OUT1 and 2. IN1 = "H" : OUT1= "L", OUT2 = "H". 2 - phase excitation
007	GND	-	-	-	IC power (GND)	
008	Vcont	-	I	-	Output voltage control	Not used
009	IN2	ST3	I	H / L	Shutter control terminal 2	Controls OUT3 and 4. IN2 ="H" : OUT3 = "L", OUT4 = "H". 2 - phase excitation
010	OUT4	-	O	-	Shutter drive output 4	Applies voltage to coil with OUT3. $\overline{OUT3}$
011	Vs2	-	-	-	Driver power	See description of pin 4. Connected on FPC.
012	OUT3	-	O	-	Shutter drive output 3	Applies voltage to coil with OUT4. $\overline{OUT4}$
013	ENA2	ENA	I	H	Enable signal	See description of pin 2. Connected on FPC.
014	GND	-	-	-	IC power (GND)	

IC402 (Regulator IC / Booster Driver), 5 pins

Pin No.	Terminal name	Signal name (CPU)	I/O A/D	Active direc - tion	Functions	Description
001	Vout	-	-	-	Output of regulated DC power	2.3V output / 150mW
002	Vdd	-	-	-	IC power	Operable at 0.9V or above
003	Vss	-	-	-	IC power (GND)	
004	$\overline{CE}$	-	-	L	Chip enable	Active (regulating operation) at "L", standby at opening
005	EXT	-	-	L	Output for external transistor control	Controls base current of PNP transistor for regulating.

IC501 (Motor Driver IC), 10 pins

Pin No.	Terminal name	Signal name (CPU)	I/O A/D	Active direc - tion	Functions	Description
001	Vcc	-	-	-	Power supply (emitter common)	NC. Connected to pin 10 in IC.
002	PNP1	-	I	L	Forward run signal (upper)	PNP base. Forward run at ON. + side of motor
003	OUT1	-	O	-	Output (+ side of motor)	Winding at + voltage
004	NPN1	-	I	H	Reverse run signal (lower)	PNP base. Reverse run at ON. + side of motor
005	GND	-	-	-	Power supply (GND)	NC. Connected to pin 6 in IC.
006	GND	-	-	-	Power supply (GND)	NPN emitter
007	NPN2	-	I	H	Reverse run signal (upper)	PNP base. Reverse run at ON. − side of motor
008	OUT2	-	O	-	Output (− side of motor)	Rewind at + voltage
009	PNP2	-	I	L	Forward run signal (lower)	PNP base. Forward run at ON. −side of motor

Pin No.	Terminal name	Signal name (CPU)	I/O A/D	Active direc - tion	Functions	Description
010	Vcc	-	-	-	Power supply (emitter common)	PNP emitter

IC601 (Light Metering IC), 20 pins

Pin No.	Terminal name	Signal name (CPU)	I/O A/D	Active direc - tion	Functions	Description
001	CATHO	-	O	-	Common cathode of SPD	Non - inversion input of Log Amp. Generates reference voltage to cancel backward saturation current of Log Diode.
002	NC	-	-	-	No connection	Not used
003	AROUN	-	I	-	Anode of surrounding SPD	Inversion input of Log Amp. Performs imaginary short of SPD and has photocurrent flow in Log Diode and converts it to logarithmically compressed voltage. Surrounding SPD
004	NC	-	-	-	No connection	Not used
005	GND	-	-	-	Power supply GND	
006	BGAP	-	O	-	Band gap output	Reference voltage in IC free from temperature dependence. 1.2V
007	TO2	-	I	-	Inversion input of temperature sensor amp	Resistor for canceling offset is connected.
008	BGAP2	-	I	-	Non - inversion input of temperature sensor amp	Resistor for determining inclination of temperature output is connected.
009	TO	TAD	A/D	-	Temperature sensor output	Outputs linear voltage to temperature. 17.8 mV / ℃
010	OFSET	-	O	-	Offset adjustment of light meter - ing output	Determines offset voltage relative to brightness. 47K Ω is mounted outside.

Pin No.	Terminal name	Signal name (CPU)	I/O A/D	Active direc - tion	Functions	Description
011	VR	Vref	O	-	Reference voltage generation for A / D conversion	Supplies reference voltage for A / D conversion to outside. 3.5V
012	POC	SEL (AE)	I	H / L	Light metering area select terminal	Selects area by input level. "H" : center, "L" : surrounding
013	PO	VPAD	A/D	-	Light metering output	Outputs voltage corresponding to brightness.
014	POO	-	I	-	Non - inversion input of light metering amp	Log amp output is connected.
015	PO2	-	I	-	Inversion input of light metering amp	Resistor for determining gain of light metering amp which amplifies Log Amp output.
016	Vcc	-	-	-	Power supply	IC power. 5V input
017	NC	-	-	-	No connection	Not used
018	CENTE	-	I	H	Anode of center SPD	See description of pin 3. Center SPD
019	NC	-	-	-	No connection	Not used
020	CATHO	-	O	-	Common cathode of SPD	Same as pin 1

IC701 (AF focusing IC), 16 pins

Pin No.	Terminal name	Signal name (CPU)	I/O A/D	Active direc - tion	Functions	Description
001	SS	SEL (AF)	I	H / L	Sensor sensitivity select	"H" : low sensitivity "L" : high sensitivity
002	L	-	O	⌐/¬	End of left sensor accum.	"H" during internal reset. See below (pin 3) for accumulation.

Pin No.	Terminal name	Signal name (CPU)	I/O A/D	Active direc - tion	Functions	Description
003	R	-	O	↓/↑	End of right sensor accum.	↓ at first end of sensor accumulation. ↑ at completion of sensor array.
004	EXTEN	EXTE	I	L	Externally forced end	Accumulation is ended forcedly at "L" pulse input and arithmetic starts.
005	RESET	AFRES	I	L	Initialization of IC	"L" : stops oscillation and initializes accum. and arithmetic. ↓ : start
006	CLK1	-	-	-	Terminal to mount ext. resistor for oscillation	Built - in terminal of CR oscillation circuit. Internal oscillation of 2MHz occurs with 6.8 K Ω mounted outside.
007	CLK2	-	-	-	Same as above	
008	Vcc	-	-	-	IC power	Input 5V.
009	TEST1	-	I	L	IC test mode input	Pull - up resistor is incorporated. NC
010	OR	-	O	↓	First sensor response	Turns "H" by responding to pin 2 or 3, whichever earlier.
011	TEST2	-	I	L	IC test mode input	Pull - up resistor is incorporated. NC
012	DATA	AFD	O	H / L	AFDATA output terminal	Outputs AF data in synchronization with read clock after completion of arithmetic.
013	END	END	O	H	End signal of accum. and arithmetic	Turns "L" at $\overline{\text{RESET}}$ "L" and turns "H" after AF operation.
014	TEST3	-	I	L	IC test mode input	Pull - up resistor is incorporated. NC
015	SCK	AFCK	I	-	Read clock	Sends clock at read of AF data. Changes data at ↓
016	Vss	-	-	-	Power supply (GND)	IC power

IC801 (EEPROM), 8 pins

Pin No.	Terminal name	Signal name (CPU)	I/O A/D	Active direc − tion	Functions	Description
001	CS	ROMCS	I	H	Chip select	Operable at "H"
002	SCK	SCK	I	−	Serial clock	Inputs from CPU as clock for serial communication.
003	DI	SO	I	−	Serial input	Stores status information and adjustment data in memory.
004	DO	SI	O	−	Serial output	Outputs status information and adjustment data from memory.
005	GND	−	−	−	Power supply (GND)	
006	ORG	−	I	H / L	Memory setup select terminal	"H" : 64 * 16 bits, "L" : 128 * 8 bits This camera is locked to "L".
007	TEST	−	I	−	IC test input	Not used
008	Vcc	−	−	−	Power supply	5V

[DESCRIPTION OF FUNCTIONS OF ELECTRIC PARTS]

Symbol	Part Name	P. No.	Functions
IC101	CPU	M38254M6 - GP	Sequence control Display control (LCD, LED) Power supply circuit control (standby ⟷ power hold) Input read (switches, detection of analog quantity) Sensor read (light metering, AF focusing) Peripheral circuit control (flash, shutter, winding)
IC201	Power supply IC	RS5RM5045B	Power supply circuit of system. Detection of voltage boosting and voltage down
IC202	Voltage detection IC	S80725SN - DN	System reset
IC203	3 - terminal regulator	S81223SG - QW	Reference output for LCD power charge pump
IC401	Stepping motor driver	LB1838M	Shutter motor driver
IC402	Regulator (booster driver)	RN5RG20	Regulated DC power supply control for shutter drive
IC501	DC motor driver	UN230	Winding motor driver
IC601	Light metering IC	H4426 - 02	Light metering IC integrated with 2 - division SPD. Logarithmically compressed voltage output. Output of reference voltage for A / D conversion. Temperature sensor output
IC701	AF focusing IC	FM6221T11	Passive AF focusing IC integrated with optical system. Serial output
IC801	EEPROM	LE93C46M6	Back - up memory (adjusting value, status information)
IC802, 803	Analog switch	TC7S66F	Standby release switch separation
Q101	Double NPN transistor	FC116	Date module interface
Q201	NPN power transistor with D	FP301	Voltage boosting switching / rectifying
Q202	PNP transistor	2SA1519	Switch for peripheral circuit power (Vdd)
Q301	NPN transistor	2SC4069	Flash charge control
Q302	PNP transistor	2SA1520	Flash charge (power transistor pre - driver)
Q303	PNP power transistor	2SA1615 - K	Flash charge (switch on primary side)
Q304	NPN transistor	2SC2812	Prevention of overcharge
Q305	NPN transistor	2SC4047	Flash firing stop
Q306	IGBT	CT20AML - 8	Flash firing control
Q307	Thyristor	CR05AS - 8	Flash firing trigger

Symol	Part Name	P. No.	Functions
Q401	Double NPN transistor	FC104	Quantizing of shutter photo - coupler signal / inversion of enable signal
Q402	PNP power transistor	2SB1121	Regulated DC power supply for shutter drive
Q403 *1	Double NPN transistor	FC116	Shutter PC - LED switch / AF - assist beam switch
Q404, 405	Double PNP transistor	FC117	Ch. compensation on shutter driver
Q501, 502	Double NPN transistor	FC116	Control logic for winding motor driver
Q503	NPN transistor	2SC4047	PC - LED switch for film travel detection
Q601	PNP transistor	2SA1496	Switch for A / D conversion power (Vref2)
Q701	PNP transistor	2SA1881	AF - assist beam emitter drive
Q801	NPN transistor	2SC4047	Inversion of matrix select control signal
Q802 ~ 805	Double NchMOSFET	μ PA606T	Matrix select
Q901	Double NPN transistor	FC116	Switch of viewfinder backlight LED / self - timer LED
D301	Diode	MA152K	Flash oscillation (switching off by counter electromotive force)
D302	Zener diode	MA3200M	Detection of flash overcharge
D303	High - voltage diode	SM1XF16	Flash oscillation rectifying
D304	Diode	SM1XN04	Prevention of main capacitor leak
D305	Zener diode	MA3120M	Generation of Q306 control voltage
D306	Diode (power)	SM1XSN6	Generation of double voltage for Xenon tube
D701	Red LED (high output)	NR312 - 3	Emission of AF - assist beam
D901	Green LED	L121 - 020 YG	Viewfinder display backlight LED
D902	Red LED	LN1271RAL	Self - timer LED
PC501	Photo reflector	SG105F - CD	PC for detecting film travel
L201	Coil	LQH4N560K04	Choke coil for voltage boosting
L301	Oscillation trans	Y370B	Flash voltage boosting
L302	Trigger coil	KP - 33B	Flash firing trigger voltage
X101	Crystal oscillator	DT - 26S	Sub clock 32 KHz
X102	Ceramic resonator	KBR5.0MWSTR	Main colck 5MHz
R101	Resistor (1608 size)	56K Ω 1 / 16W	Pull - up resistance. AF data line
R102	Resistor (1608 size)	10M Ω 1 / 16W	Feedback resistance of oscillation circuit
R103	Resistor (1608 size)	220K Ω 1 / 16W	Stabilization of oscillation
R201	Resistor (1608 size)	1K Ω 1/ 16W	Shunt resistance of booster switching transistor

Symbol	Part Name	P. No.	Functions
R202	Resistor (1608 size)	150 Ω 1 / 16W	Base current limiting of booster switching transistor
R203	Resistor (1608 size)	100K Ω 1 / 16W	Rising time constant at reset cancellation
R301	Resistor (2125 size)	10 K Ω 1 / 10W	Base current limiting of flash charge control transistor
R302	Resistor (2125 size)	1.5 K Ω 1 / 10W	Base limiting of primary – side power transistor of flash
R303	Resistor (2125 size) ± 2%	22K Ω 1 / 10W	Detection (voltage generation) of flash charge completion
R304, 305	Resistor (3216 size) ± 2%	1M Ω 1 / 8W	Detection of flash charge completion / prevention of overcharge
R306	Resistor (3216 size)	10M Ω 1 / 8W	Generation of Q306 control voltage
R307	Resistor (3216 size) ± 2%	1M Ω 1 / 8W	Charge at flash firing trigger voltage / double voltage for Xenon tube
R309	Resistor (2125 size)	330 Ω 1 / 10W	Gate current limiting of Q306
R310	Resistor (3216 size)	100K Ω 1 / 8W	Application of double voltage to Xenon tube
R311	Resistor (reed type)	22 Ω 1 / 4W	Protection of Q307
R312	Resistor (2125 size)	1K Ω 1 / 10W	Gate grounding of Q307
R313	Resistor (2125 size)	470 Ω 1 / 10W	Gate current limiting of Q307
R314	Resistor (2125 size) ± 2%	110K Ω 1 / 10W	Detection of flash charge completion / prevention overcharge
R401 *2	Resistor (1608 size)	1.5K Ω 1 / 16W	Current rank selection of shutter PC – LED
R402 *2	Resistor (1608 size)	680 Ω 1 / 16W	Current limiting of shutter PC – LED
R403	Resistor (1608 size)	20K Ω 1 / 16W	Shunt resistance of transistor for quantizing shutter PC photocurrent
R404	Resistor (1608 size)	10K Ω 1 / 16W	Base limiting of transistor for inverting shutter enable signal
R405	Resistor (1608 size)	10 K Ω 1 / 16W	Stabilization of booster transistor for regulated DC voltage of shutter
R406	Resistor (1608 size)	10 K Ω 1 / 16W	Battery check voltage filter
R407 ~ 410	Resistor (1608 size)	150 Ω 1 / 16W	Base limiting of transistor for ch. compensation on shutter driver
R501 ~ 504	Resistor (1608 size)	150 Ω 1 / 16W	Base limiting of winding motor driver
R505	Resistor (1608 size)	470 Ω 1 / 16W	Current limiting of film travel detecting PC – LED
R506	Resistor (1608 size)	56K Ω 1 / 10W	Conversion of film travel detection photocurrent to voltage
R602	Resistor (1608 size) ± 2%	47K Ω 1 / 16W	Offset determination of light metering IC output
R702	Resistor (1608 size) ± 2%	6.8K Ω 1 / 16W	AF focusing IC oscillation
R703	Resistor (3216 size)	3.3 Ω 1 / 4W	Current limiting of AF – assist beam LED
R704	Resistor (1608 size)	240 Ω 1 / 16W	Base current limiting of transistor for driving AF – assist beam LED
R801	Resistor (1608 size)	56K Ω 1 / 16W	Inversion of matrix select control signal

Symbol	Part Name	P. No.	Functions
R802	Resistor (1608 size)	1M Ω 1 / 16W	Pull - up of interruption input of Focus Dial TG Switch
R803	Resistor (1608 size)	1M Ω 1 / 16W	Pull - up of interruption input of Zoom Ring TG Switch
R804	Resistor (1608 size)	1M Ω 1 / 16W	Pull - up of Back Cover Switch input
R805	Resistor (1608 size)	1M Ω 1 / 16W	Pull - up of Panoramic Switch input
R806	Resistor (1608 size)	1M Ω 1 / 16W	Pull - up of interruption input of Exposure Compensation TG Switch
R901	Resistor (1608 size)	240 Ω 1 / 16W	Current limiting of viewfinder backlight LED
R902	Resistor (1608 size)	68 Ω 1 / 16W	Current limiting of Self - timer LED
VR801	Slide resistor (coupled with switch)	10K Ω	Detection of Focus Dial setting (AF, MF data)
VR802	Slide resistor (coupled with switch)	10K Ω	Detection of Zoom Ring setting (Main Switch, focal length)
VR803	Slide resistor	10K Ω	Detection of Aperture Ring setting (P, F3.5 ~ 16)
C101	Tantalum capacitor (case A)	6.8 μ F / 7V	Stabilization of IC101 power
C102, 103	Ceramic capacitor (1608 size)	22pF / 50V	Load capacity for IC101 sub clock
C104	Ceramic capacitor (2125 size)	0.47 μ F / 25V	Capacitor for LCD power charge pump
C105	Ceramic capacitor (2125 size)	0.47 μ F/ 25V	Double voltage boosting accumulation of charge pump (4.6V)
C106	Ceramic capacitor (2125 size)	0.47 μ F/ 25V	Triple voltage boosting accumulation of charge pump (6.9V)
C107	Tantalum capacitor (case A)	10 μ F / 4V	Reference voltage stabilization for IC101 A / D conversion
C201	Tantalum capacitor (case B)	22 μ F / 7V	Stabilization of voltage boosted power
C202	Tantalum capacitor (case C)	68 μ F / 7V	Stabilization of regulated voltage (Vcc)
C203	Ceramic capacitor (1608 size)	0.1 μ F / 25V	Rising time constant at reset cancellation
C204	Ceramic capacitor (2125 size)	0.47 μ F / 25V	Stabilization of regulated voltage (LCD power, 2.3V)
C301	OS capacitor	47 μ F / 6.3V	Compensation of battery voltage at flash charge
C302	Ceramic capacitor (2125 size)	1000pF / 50V	Stabilization of flash oscillation
C303	Ceramic capacitor (2125 size)	0.01 μ F / 25V	By - pass capacitor for charge completion A / D voltage
C304	Ceramic capacitor (3225 size)	0.022 μ 500V	Stabilization of detection voltage of overcharge prevention circuit

Symbol	Part Name	P. No.	Functions
C305	Aluminum capacitor	280 μ F / 300V	Main capacitor of flash
C306	Film capacitor	0.01 μ / 350V	Generation of double voltage to Xenon tube
C307	Film capacitor	0.022 μ 350V	Generation of Xenon tube trigger voltage
C308	Ceramic capacitor (2125 size)	0.01 μ F / 25V	Noise absorption for flash firing thyristor gate
C402	Tantalum capacitor (case A)	10 μ F / 4V	Stabilization of shutter drive voltage
C403	Ceramic capacitor (1608 size)	0.1 μ F / 25V	Battery check voltage filter
C502	Ceramic capacitor (1608 size)	0.1 μ F / 25V	Detection of film travel, Noise absorption
C601	Tantalum capacitor (case A)	6.8 μ F / 7V	Stabilization of light metering IC power
C602	Tantalum capacitor (case A)	10 μ F / 4V	Stabilization of reference voltage output for Vref
C701	Ceramic capacitor (1608 size)	0.1 μ F / 25V	Bypass capacitor for AF focusing IC power
C702	Tantalum capacitor (case A)	6.8 μ F / 7V	Stabilization of AF focusing IC power

* Missing numbers

The following numbers are missing :
R308, R601, R701
C401, C501

* Modified parts of FPC

The tables above show the electric parts of the new FPC. The parts of the old FPC are different from those of the new one in the following points :
Old FPC

- Q403 is separated into two single type transistors —— one for the shutter and the other for AF - assist beam emitter. (See *1)

  Shutter : Q403 (2SC4047)
  AF - assist beam emitter : Q702 (2SC4047)

- R401 is not used. R402 is replaced with another one (470 Ω), which is also used for the current rank selection of shutter PC - LED. (See *2)

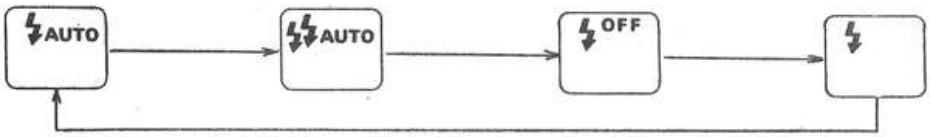
[FUNCTIONS OF SWITCHES]

* : External operation switches. PH : Power hold switches

Symbol	Name	Functions
* S1	Check Switch	Light metering and AF focusing is locked at depress the Shutter Release Button halfway. Option : Lens is driven when "1" has been selected. Active at "L" (PH)
* S2	Shutter Release Switch	This switch is turned on at depress the Shutter Release Button all the way to activate the shutter. Option : Lens is driven for the first time when "0" has been selected. Active at "L" (PH)
* S3	Self - timer Switch	This switch sets self - timer mode. Self - timer operates when the Shutter Release Switch is turned on with the Self - timer Switch slided to ON. Active at "L"
* ZMTG ZMAD	Zoom Switches	These switches turn ON / OFF the Main Switch and sets a focal length. Zoom setting value is detected as voltage. ZMTG turns on power. ZMAD detects setting. (PH)

Zoom Board	Position	OFF	Boundary	WIDE end	28/29	29/30		54/55	55/56	TELE end
ZMAD	Voltage mV	296.30	1200.0	1266.7	1339.8	1408.2		3076.2	3144.5	3211.1
	A / D value	16	58	5D	5D +05	5D +0A		EB −0A	EB −05	EB

* REW	Rewind Switch	This switch is turned on by press of the Mid - roll Rewind Button to start rewinding the film at mid - roll. Rewinding is started by OFF → ON with the Back Cover closed. Setting of manual adjustment mode is checked by ON → OFF with the Back Cover open. Active at "L"
BCOV	Back Cover Switch	This switch for detecting the open / close of the Back Cover is turned on at opening the Back Cover. Immediately after closing the Back Cover, blank shots advance is performed. "L" : open, "H" : close (PH)
*PNRM	Panoramic Switch	This switch selects normal format or panoramic format. In linkage with the panoramic switch, the viewfinder frame changes to a panoramic format. (Transmissible LCD) "L" : panoramic, "H" : normal

Symbol	Name	Functions
*STRB	Flash Mode Switch	Each press of the Flash Mode Button changes flash mode. Auto - flash Red - eye reduction Flash - off Fill - in flash pre - flash  (PH)
*FDTG FDAD	Focus Dial Switches	These switches detect a focus position. The setting value of the Focus Dial is detected as voltage. Auto focusing ——— "AF" mark Manual focusing —— " ∞ ～ 0.5" (m) granduations FDTG turns on power. FDAD detects setting. (PH)

FD Board FDAD	Distance	AF	Boundary	∞		0.5m
	Voltage mV	231.28	439.43	647.58		114.55
	A / D value	11	20	2F		E4

*ECTG ECDR	Exp. Compensation Timing Switch Exp. Compensation Direction Switch	These switches detect the direction of turning for exposure compensation. At turning the Exp. Compensation Dial, a compensation value is set by detecting the direction of turning (from ECTG and ECDR). Exposure compensation can be made up to ± 5EV in 1/ 3 step increments.

Exposure compensation	Click	← −		+ →	Click
ECTG	1	0	0	1	1
ECDR	1	1	0	0	1

*APAD	Aperture Switch	This switch detects the aperture setting value. At turning the Aperture Ring, the program / aperture setting value is detected as voltage.

Aperture Board APAD	Aperture value	P	F3.5	F4	F5.6	F8	F11	F16
	Voltage mV	437.50	875.00	1312.5	1750.0	2187.5	2625.0	3062.5
	A / D value	20	40	60	80	A0	C0	E0

Battery Loading Detect SW	Battery Loading Detect switch	This switch detects the presence /absence of a battery in the battery compartment. At loading a battery, the electric circuit is released from the reset status. Battery loading → OFF (Open)

Symbol	Name	Functions
DX0 DX1 DX2 DX3 DX4	DX Code Switches	These switches detect the ISO sensitivity of the film. (ISO25～5000, 1/3 steps)

B. DISASSEMBLY & REASSEMBLY PROCEDURES

No.	419-01-50-RA3BK02

REMOVAL OF EXTERIOR PARTS

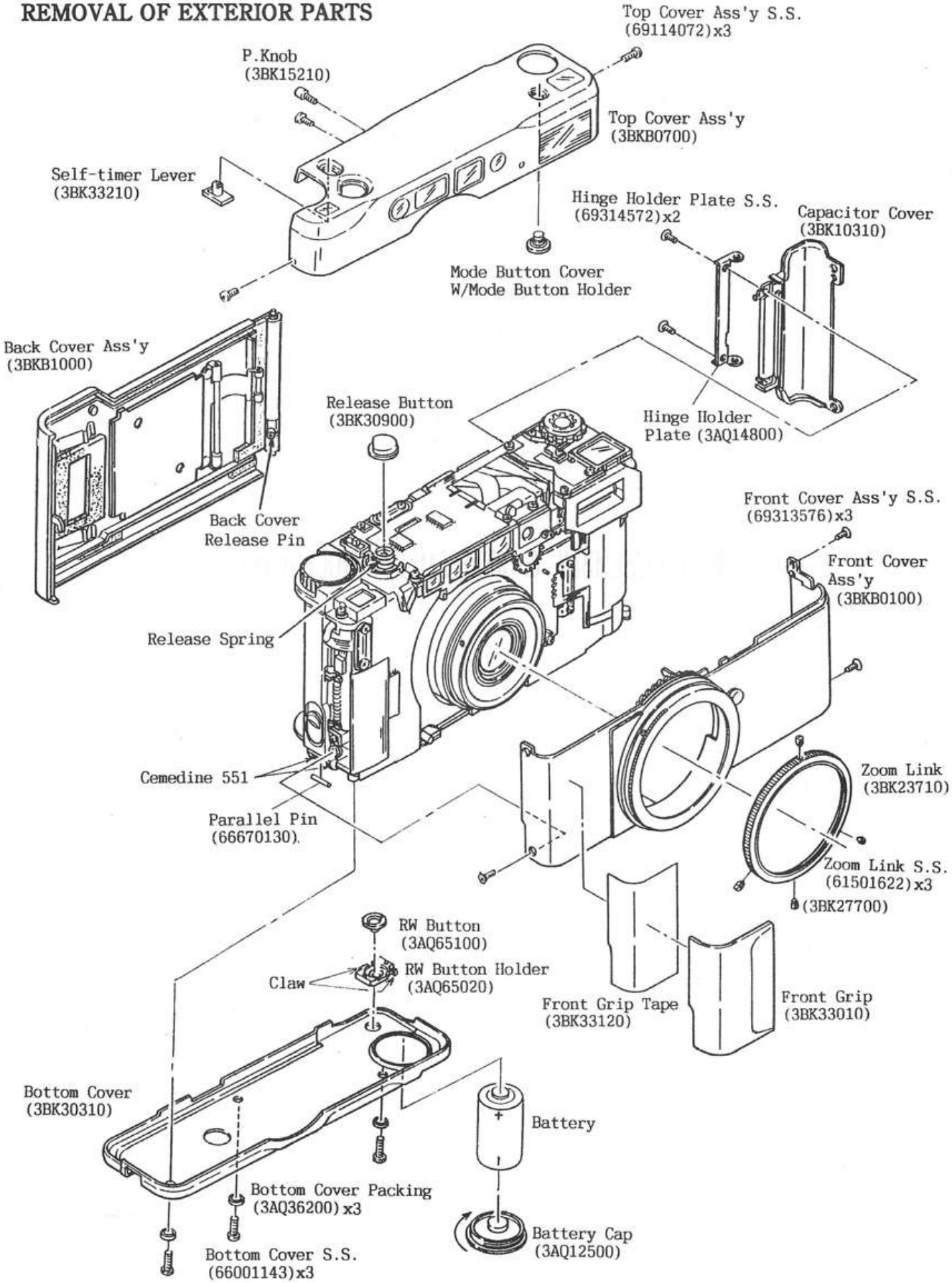


Fig.1

B - 1. REMOVAL OF EXTERIOR PARTS

B - 1 - 1. Removal of Back Cover Ass'y

1) Open the Back Cover and remove the Back Cover Ass'y (3BKB1000) while pushing up the Back Cover Release Pin.

B - 1 - 2. Removal of Top Cover Ass'y

1) Remove the P. Knob (3BK15210).
2) Remove the Top Cover Ass'y Setscrews (69114072) × 3 and take off the Top Cover Ass'y (3BKB0700).
3) After the removal of the Top Cover Ass'y, you can take off the Release Button (3BK30900), Self - timer Lever (3BK33210) and the Mode Button Cover (3BK33300) W / Mode Button Holder (3BK33400).

Notes:

a) Take care not to deform the Release Spring (3BK31000) after the removal of the Top Cover Ass'y.
b) Take care not to leave your fingerprints on the window glasses of the Top Cover Ass'y, the viewfinder lenses or the LCDs. Also take care not to flaw them.

B - 1 - 3. Removal of Bottom Cover

1) Remove the Battery Cap (3AQ12500) by turning it in the direction of the arrow and take out the battery.
2) Remove the Bottom Cover S.S. (66001143) × 3 and Bottom Cover Packing (3AQ36200) × 3 and take off the Bottom Cover (3BK30310)
3) After the removal of the Bottom Cover, you can take off the RW Button Holder (3AQ65020) and the RW Button (3AQ65100).

Notes:

a) Remove the strap, if installed, from the camera beforehand.
b) The Parallel Pin (66670130) is attached to the Body with the bond (Cemedine 551).

[Notes on Installation of RW Button Holder]

a) Clean the patterns of the RW Button and Main FPC with lens cleaning paper with ether alcohol and then install the RW Button and RW Button Holder.
b) When installing the RW Button Holder, make sure that the two claws of the RW Button Holder are hooked in the grooves in the MM Base Plate Caulking Ass'y.

B - 1 - 4. Removal of Front Cover Ass'y

1) Remove the Zoom Link Setscrews (61501622) × 3, (3BK27700) and take off the Zoom Link (3BK23710).
2) Peel off the Front Grip (3BK33010).
3) Remove the Front Cover Ass'y Setscrews (69313576) × 3 and take off the Front Cover Ass'y (3BKB0100).

Notes:

a) The Zoom Link Setscrews (61501622) × 3, (3BK27700) are fixed with Screw lock 1401 (made by Sony) on their heads. Before removeing the setscrews, apply thinner to the heads and wait until the Screw Lock softens.
b) The Front Grip is attached to the Front Cover Ass'y with the Front Grip Tape (3BK33120) (double - stick tape). Once the Front Grip is peeled off, its adhesive strength weakens. Be sure to replace the Front Grip Tape with a new piece.

B - 1 - 5. Removal of Capacitor Cover

1) Remove the Hinge Holder Plate Setscrews (69314572) × 2 and take off the Hinge Holder Plate (3AQ14800) and Capacitor Cover (3BK10310).

[Installation Procedure for Front Cover]

1) Turn the Cam Drive Gear of the Viewfinder in the direction of the arrow Ⓐ (to TELE side) and return it to the WIDE side by one tooth of Cam Drive Gear.
2) Insert tweezers or a like tool between the Lens Cell Light - shield Paper (3BK23900) and the Lens Barrel and move the Aperture Lever (incorporated in the Lens Barrel) in the direction of the arrow Ⓑ (aperture opening direction). (See Figs. 2 and 15)
3) Insert tweezers or a like tool between the Lens Cell Light - shield Paper (3BK23900) and the Lens Barrel and move the Zoom Pin (incorporated in the Lens Barrel) in the direction of the arrow Ⓒ (to TELE position). (See Figs. 2 and 15)
4) Turn the Aperture Ring (3BK20210) on the Front Cover in the direction of the arrow Ⓓ and set it in the "P" position.
5) Turn the Zoom Ring Ass'y (3BKB0500) on the Front Cover in the direction of the arrow Ⓔ and set it in the TELE position.
6) Install the Front Cover on the Body.
   In doing so, insert the Aperture Lever of the Lens Barrel in the fork of the Aperture Lever of the Front Cover. And insert the Zoom Pin of the Lens Barrel in the fork of the Zoom Lever of the Front Cover.

Notes:
The Front Cover incorporates the steel balls for the clicks of the Aperture Ring and Zoom Ring. Take care not to lose them.

7) Turn the Aperture Ring and make sure that the aperture size changes.
8) Turn the Zoom Ring Ass'y and make sure that the Zoom Lens moves.
9) Tighten the Front Cover Ass'y Setscrews (69313576) × 3.
10) Set the Lens in the TELE position by turning the Zoom Ring Ass'y, install the Zoom Link (3BK23710) and tighten the Zoom Link Setscrews (61501622) × 3, (3BK22700).

Notes:
Tighten the four setscrews of the Zoom Link evenly. After tightening, turn the Zoom Ring and make sure that it turns smoothly without uneven motion, creaking, obstruction or catch.
(WIDE ⟷ TELE operation torque : 300 ~ 600 gcm)

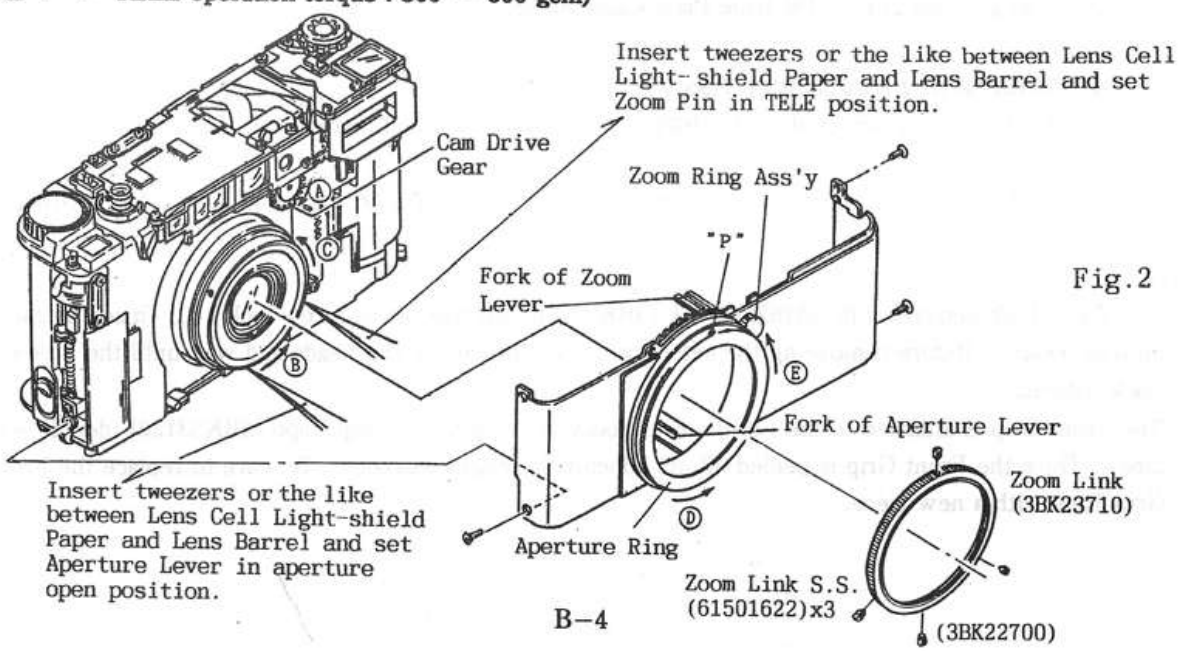

Insert tweezers or the like between Lens Cell Light- shield Paper and Lens Barrel and set Zoom Pin in TELE position.
Cam Drive Gear
Zoom Ring Ass'y
"P"
Fork of Zoom Lever
Fork of Aperture Lever
Zoom Link (3BK23710)
Insert tweezers or the like between Lens Cell Light-shield Paper and Lens Barrel and set Aperture Lever in aperture open position.
Aperture Ring
Zoom Link S.S. (61501622)x3
(3BK22700)

Fig.2

Unsoldering on Main FPC Ass'y

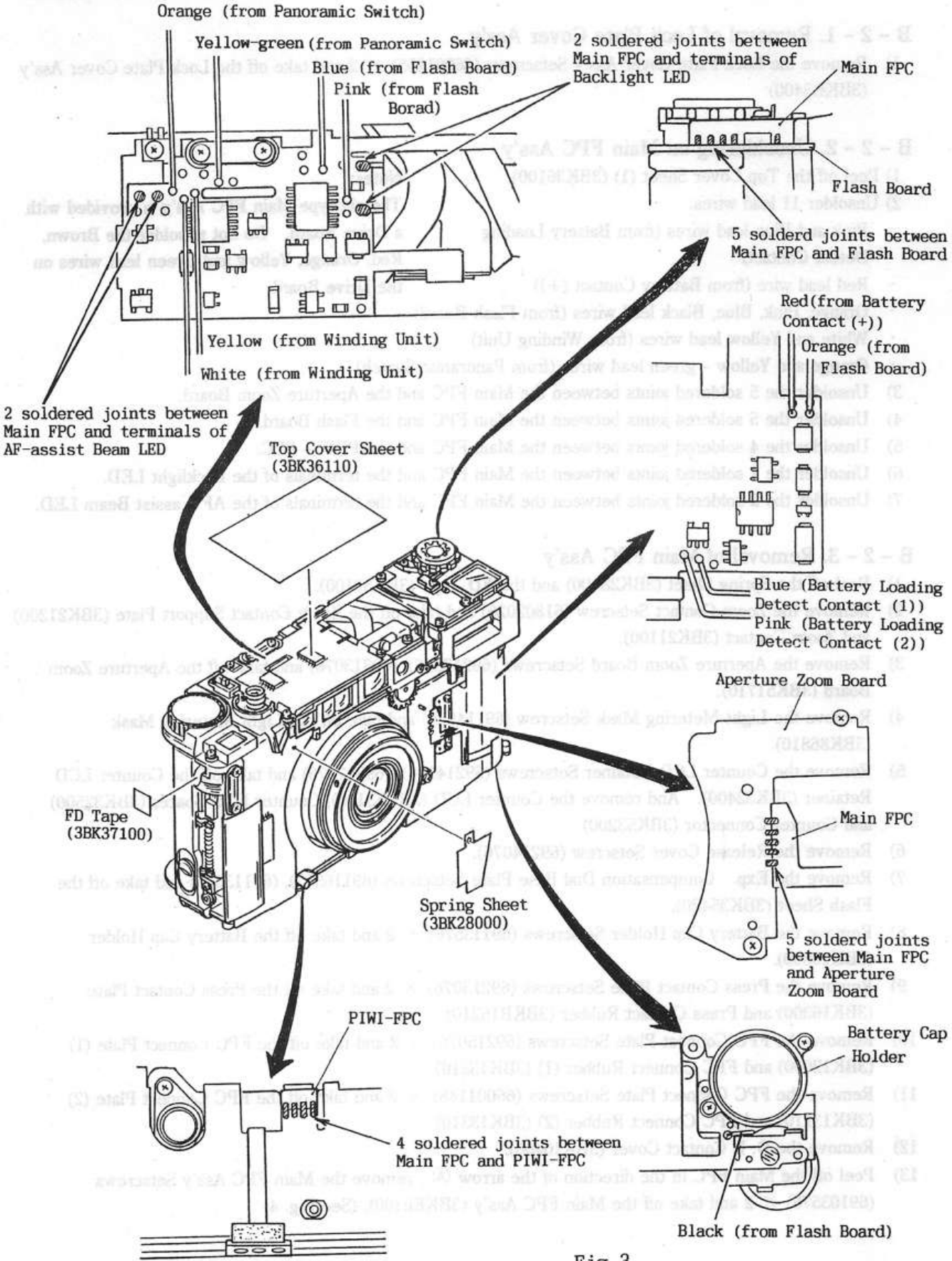

Orange (from Panoramic Switch)
Yellow-green (from Panoramic Switch)
Blue (from Flash Board)
Pink (from Flash Borad)
2 soldered joints bettween Main FPC and terminals of Backlight LED
Main FPC
Flash Board
5 solderd joints between Main FPC and Flash Board
Red(from Battery Contact (+))
Orange (from Flash Board)
Yellow (from Winding Unit)
White (from Winding Unit)
2 soldered joints between Main FPC and terminals of AF-assist Beam LED
Top Cover Sheet (3BK36110)
Blue (Battery Loading Detect Contact (1))
Pink (Battery Loading Detect Contact (2))
Aperture Zoom Board
FD Tape (3BK37100)
Main FPC
Spring Sheet (3BK28000)
5 solderd joints between Main FPC and Aperture Zoom Board
PIWI-FPC
Battery Cap Holder
4 soldered joints between Main FPC and PIWI-FPC
Black (from Flash Board)

Fig.3

B - 2. REMOVAL OF MAIN FPC ASS'Y

B - 2 - 1. Removal of Lock Plate Cover Ass'y

1) Remove the Lock Plate Cover Ass'y Setscrews (66001155) × 2 and take off the Lock Plate Cover Ass'y (3BKB3400)

B - 2 - 2. Unsoldering on Main FPC Ass'y

1) Peel off the Top Cover Sheet (1) (3BK36100).
2) Unsolder 11 lead wires.
   - Pink and Blue lead wires (from Battery Loading Detect Contact)
   - Red lead wire (from Battery Contact (+))
   - Orange, Pink, Blue, Black lead wires (from Flash Board)
   - White and Yellow lead wires (from Winding Unit)
   - Orange and Yellow - green lead wires (from Panoramic Switch)
3) Unsolder the 5 soldered joints between the Main FPC and the Aperture Zoom Board.
4) Unsolder the 5 soldered joints between the Main FPC and the Flash Board.
5) Unsolder the 4 soldered joints between the Main FPC and the PIWI - FPC.
6) Unsolder the 2 soldered joints between the Main FPC and the terminals of the Backlight LED.
7) Unsolder the 2 soldered joints between the Main FPC and the terminals of the AF - assist Beam LED.

Notes:
The old type Main FPC Ass'y is provided with a Drive Board. Do not unsolder the Brown, Red, Orange, Yellow and Green lead wires on the Drive Board.

B - 2 - 3. Removal of Main FPC Ass'y

1) Peel off the Spring Sheet (3BK28000) and the FD Tape (3BK37100).
2) Remove the Zoom Contact Setscrew (61802026) and take off the Zoom Contact Support Plate (3BK21200) and Zoom Contact (3BK21100).
3) Remove the Aperture Zoom Board Setscrews (69213576), (69313076) and take off the Aperture Zoom Board (3BK51710).
4) Remove the Light Metering Mask Setscrew (69114576) and take off the Light Metering Mask (3BK86810).
5) Remove the Counter LCD Retainer Setscrews (69214076), (69217076) and take off the Counter LCD Retainer (3BK32400). And remove the Counter LCD (3BK53100), Counter LCD Spacer (3BK32500) and Counter Connector (3BK53200).
6) Remove the Release Cover Setscrew (69214076).
7) Remove the Exp. Compensation Dial Base Plate Setscrews (69116567), (69113576) and take off the Flash Sheet (3BK35420).
8) Remove the Battery Cap Holder Setscrews (69113576) × 2 and take off the Battery Cap Holder (3BK10900).
9) Remove the Press Contact Plate Setscrews (69213076) × 2 and take off the Press Contact Plate (3BK16300) and Press Contact Rubber (3BKB16210).
10) Remove the FPC Connect Plate Setscrews (69215076) × 2 and take off the FPC Connect Plate (1) (3BK13000) and FPC Connect Rubber (1) (3BK13210).
11) Remove the FPC Connect Plate Setscrews (66001148) × 2 and take off the FPC Connect Plate (2) (3BK13110) and FPC Connect Rubber (2) (3BK13310)
12) Remove the D. B Contact Cover (3BK10400).
13) Peel off the Main FPC in the direction of the arrow Ⓐ , remove the Main FPC Ass'y Setscrews (69103576) × 2 and take off the Main FPC Ass'y (3BKE0100). (See Fig. 4)

Notes:

Remove the Main FPC Ass'y carefully, since it is attached to the Body with double - stick tape.
(See page B - 8)

14) Remove the Exp. Compensation Insulation Sheet (3BK36010).

Removal of Main FPC

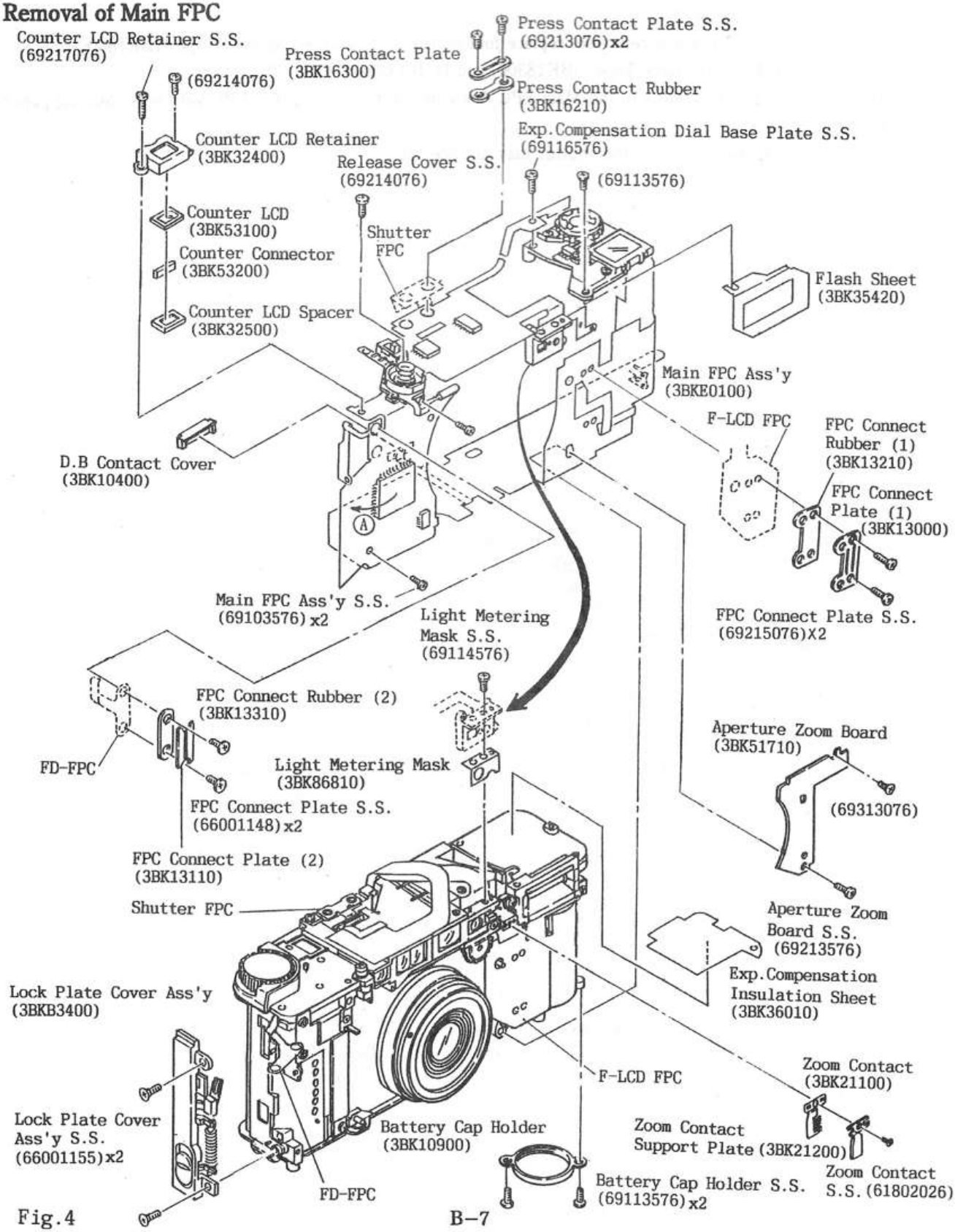


Fig.4

[Notes on Installation of Main FPC Ass'y]

a) Clean the connector patterns Ⓐ and Ⓑ of the Main FPC Ass'y with lens cleaning paper with ether alcohol.
At Ⓒ, Ⓓ and Ⓔ, clean the connector patterns on both sides with lens cleaning paper with ether alcohol.

b) When the Main FPC is replaced, never forget to attach the Self - timer Moquette (3BK37000) and L. Retaining Tape (8AG36100).

c) Once the Main FPC Ass'y is removed, replace four double - stick tapes, Rewind Tape (3BK18400), Self - timer Tape (3BK18200), Lock Tape (3BK18300) and D. B Contact Tape (3BK11700).

d) After soldering the lead wires to the Main FPC Ass'y on the Body, clean the FPC with lens cleaning paper with ether alcohol.
If the Main FPC Ass'y is dirty, the shutter may not operate.

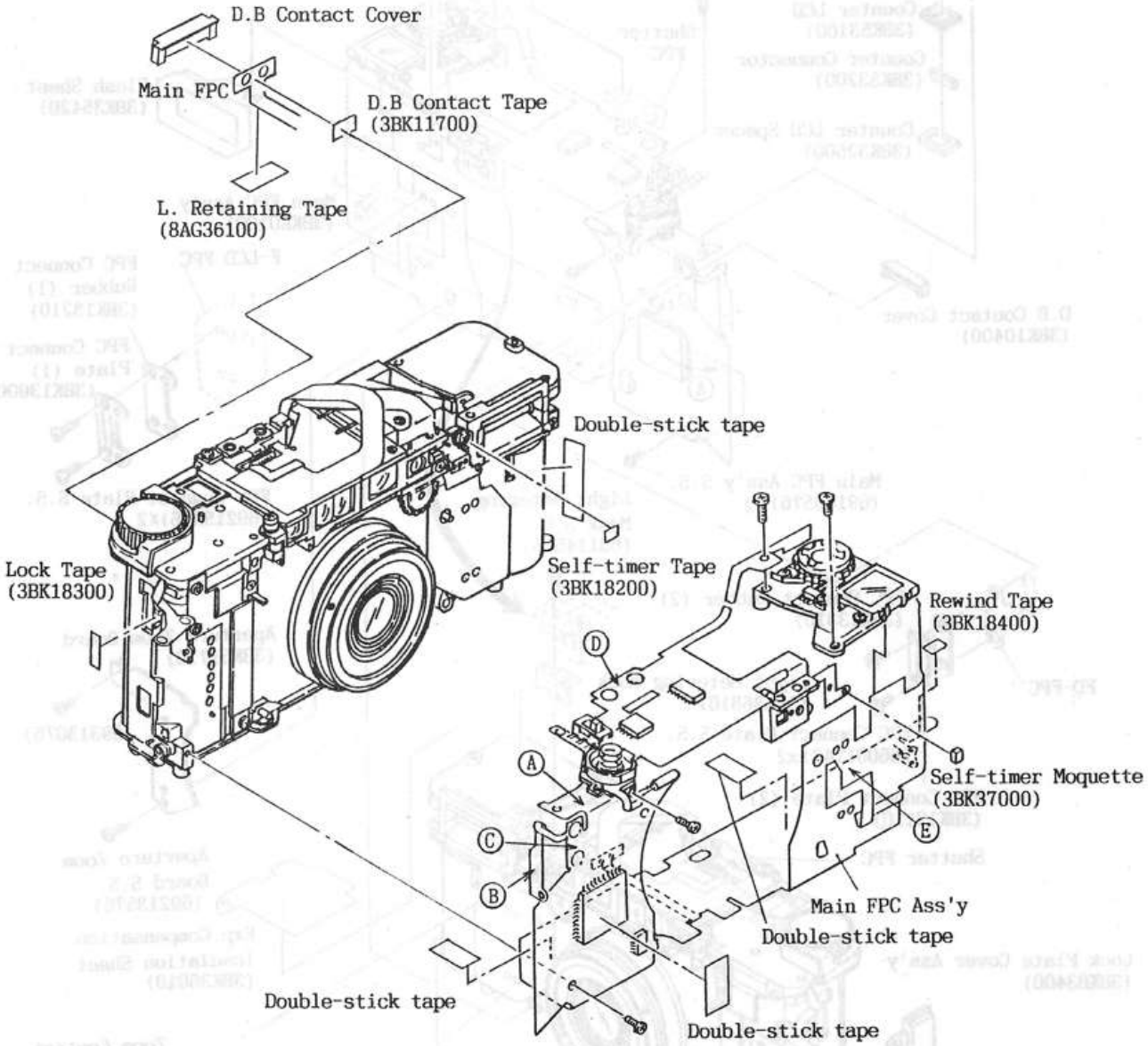


Fig.5

Removal of Flash Board & Viewfinder Ass'y

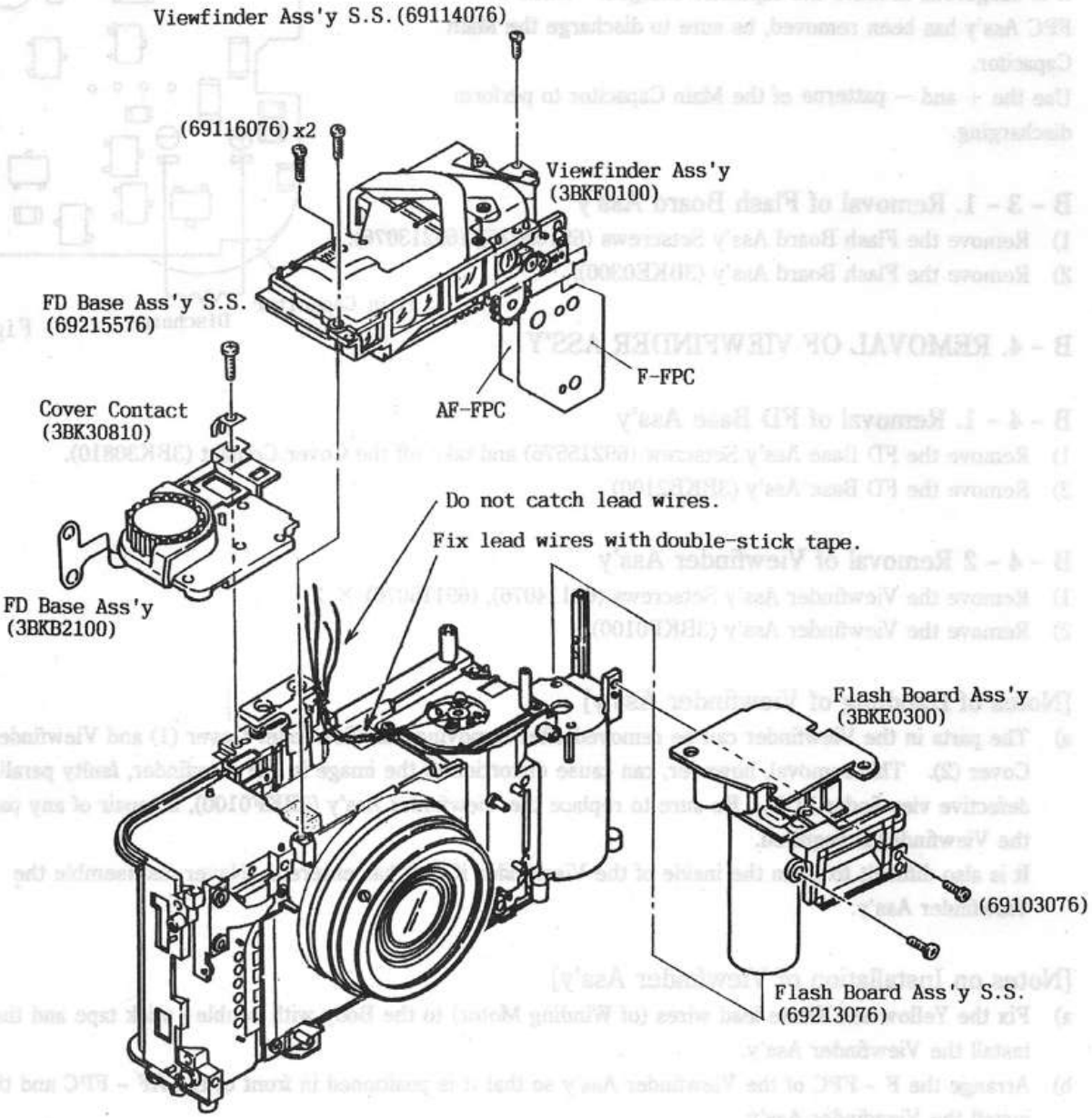


Fig.6

B - 3. REMOVAL OF FLASH BOARD ASS'Y

Notes:
The Main Capacitor on the Flash Board may have been charged. It is dangerous to leave the capacitor charged. When the Main FPC Ass'y has been removed, be sure to discharge the Main Capacitor.
Use the + and − patterns of the Main Capacitor to perform discharging.

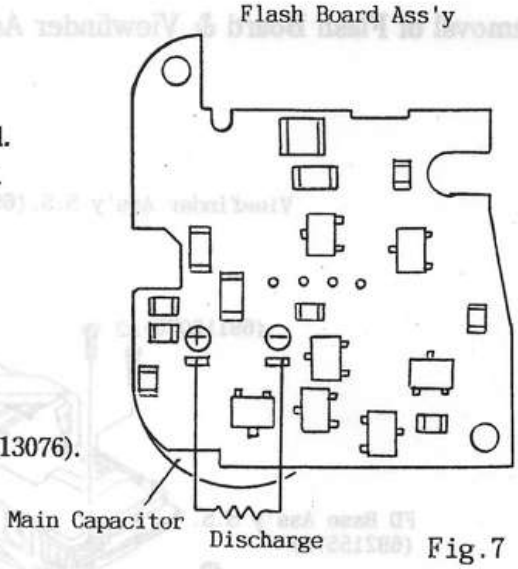


Fig.7

B - 3 - 1. Removal of Flash Board Ass'y

1) Remove the Flash Board Ass'y Setscrews (69103076), (69213076).
2) Remove the Flash Board Ass'y (3BKE0300).

B - 4. REMOVAL OF VIEWFINDER ASS'Y

B - 4 - 1. Removal of FD Base Ass'y

1) Remove the FD Base Ass'y Setscrew (69215576) and take off the Cover Contact (3BK30810).
2) Remove the FD Base Ass'y (3BKB2100).

B - 4 - 2 Removal of Viewfinder Ass'y

1) Remove the Viewfinder Ass'y Setscrews (69114076), (69116076) × 2.
2) Remove the Viewfinder Ass'y (3BKF0100).

[Notes of Handling of Viewfinder Ass'y]

a) **The parts in the Viewfinder can be removed after removing the Viewfinder Cover (1) and Viewfinder Cover (2). This removal, however, can cause distortion of the image in the viewfinder, faulty parallax or defective viewfinder LCD. Be sure to replace the Viewfinder Ass'y (3BKF0100), if repair of any part in the Viewfinder is required.**
It is also difficult to clean the inside of the Viewfinder if dust has entered. Never disassemble the Viewfinder Ass'y.

[Notes on Installation of Viewfinder Ass'y]

a) **Fix the Yellow and White lead wires (of Winding Motor) to the Body with double - stick tape and then install the Viewfinder Ass'y.**
b) **Arrange the F - FPC of the Viewfinder Ass'y so that it is positioned in front of the AF - FPC and then install the Viewfinder Ass'y**
c) **Take care that the Yellow and White lead wires (of Winding Motor) and the Yellow - green and Orange lead wires (of Panoramic Switch) are not caught between the Viewfinder Ass'y and the Body.**
d) **Clean the connector patterns of the F - FPC and AF - FPC with lens cleaning paper with ether alcohol.**

No.	419-01-50-RA3BK02

Removal of Lens Barrel

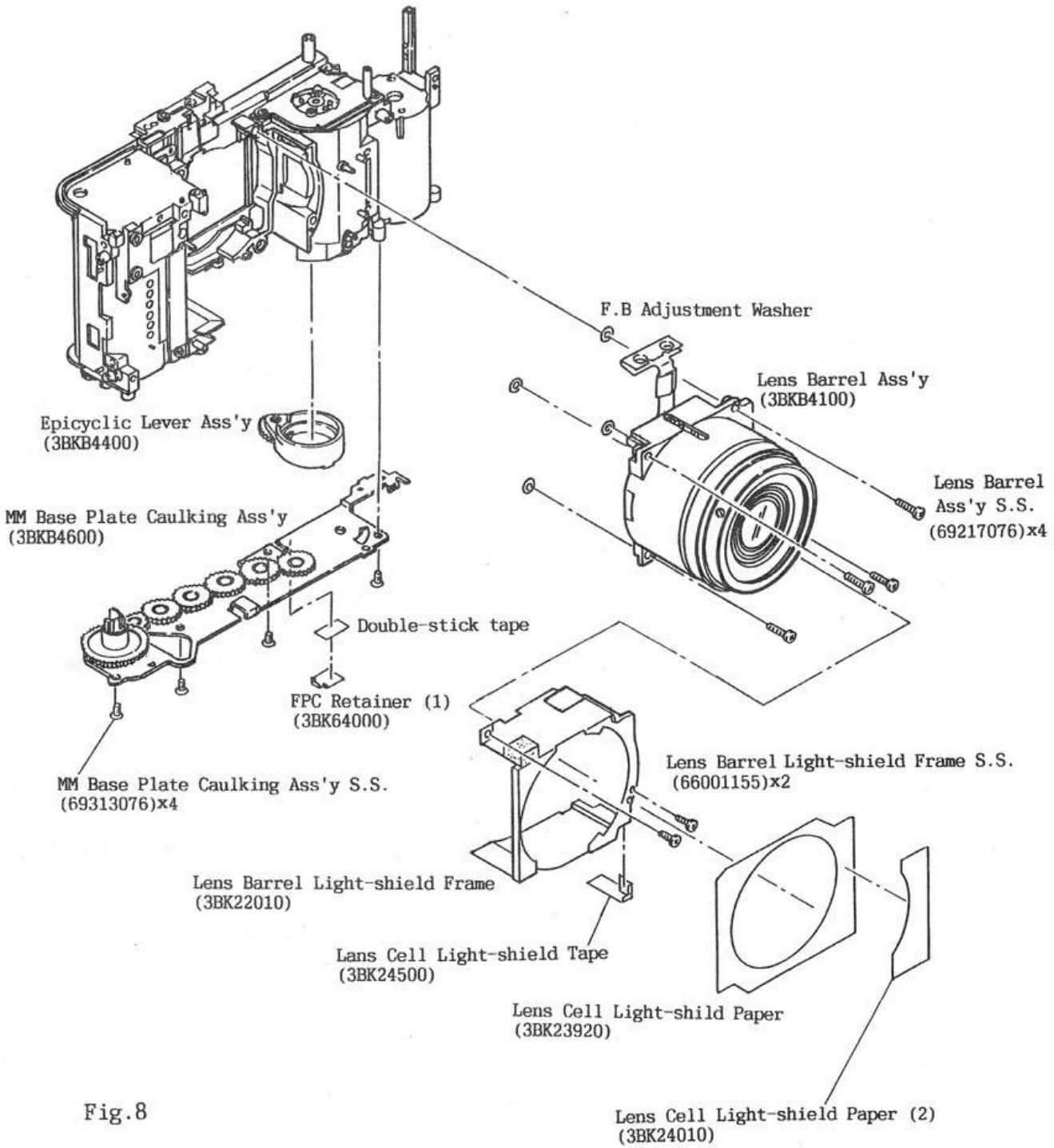


Fig.8

B - 5. REMOVAL OF LENS BARREL ASS'Y

B - 5 - 1. Removal of MM Base Plate Caulking Ass'y

1) Remove the MM Base Plate Caulking Ass'y Setscrews (69313076) × 4 and take off the MM Base Plate Caulking Ass'y (3BKB4600) and Epicyclic Lever Ass'y (3BKB4400).

B - 5 - 2. Removal of Lens Barrel Ass'y

1) Peel off the Lens Cell Light - shield Paper (2) (3BK24010).
2) Peel off the Lens Cell Light - shield Paper (3BK23920).

Notes:
The Lens Cell Light - shield Paper and Lens Cell Light - shield Paper (2) are deformed when they are peeled off.
Do not use the same Lens Cell Light - shield Paper or Lens Cell Light - shield Paper (2), once they are peeled off.

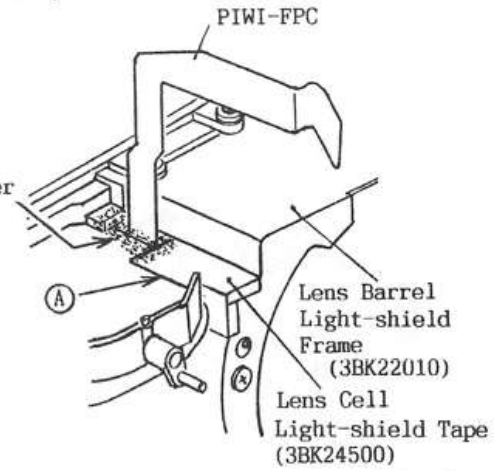


Fig.9

3) Remove the Lens Barrel Light - shield Frame Setscrews (66001155) × 2 and take off the Lens Barrel Light - shield Frame (3BK22010).
4) Remove the Black Shielder applied to the Lens Barrel Light - shield Frame and Body, using tweezers or a like tool. And peel off the Ⓐ portion of the Lens Cell Light - shield Paper (3BK24500).
5) Remove the Lens Barrel Ass'y Setscrews (69217076) × 4 and take off the Lens Barrel Ass'y (3BKB4100).

Notes:
a) When the Lens Barrel Ass'y is removed, four or eight F.B Adjustment Washers may come off. In such a case, take care not to lose the washers. (See page C - 23)
When the Lens Barrel Ass'y (3BKB4100) is replaced, adjust the flange back by installing proper Adjustment Washers.
b) After installing the Lens Barrel Light - shield Frame, apply Black Shielder to the Lens Barrel Light - shield Frame and Body.

[Notes on Installation of MM Base Plate Caulking Ass'y]

1) The FPC Retainer (1) (3BK64000) is attached to the MM Base Plate Caulking Ass'y with double - stick tape. Remove the FPC Retainer (1) before installing the MM Base Plate Caulking Ass'y.
2) When installing the MM Base Plate Caulking Ass'y, insert the PIWI - FPC (3BK50600) in the groove in the MM Base Plate Caulking Ass'y.
3) Attach double - stick tape to the MM Base Plate Caulking Ass'y.
4) Attach the FPC Retainer (1) to the double - stick tape. In doing so, insert the bent portions of the FPC Retainer (1) in the grooves in the MM Base Plate Caulking Ass'y to retain the PIWI - FPC.

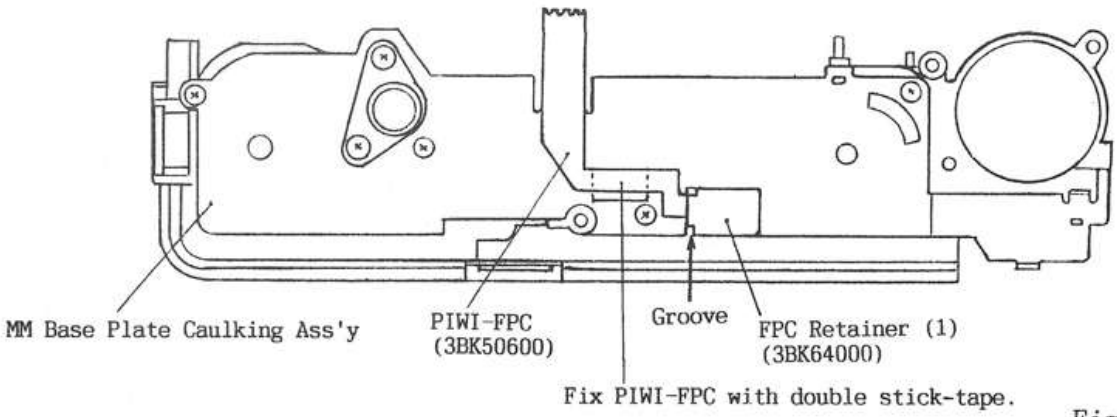
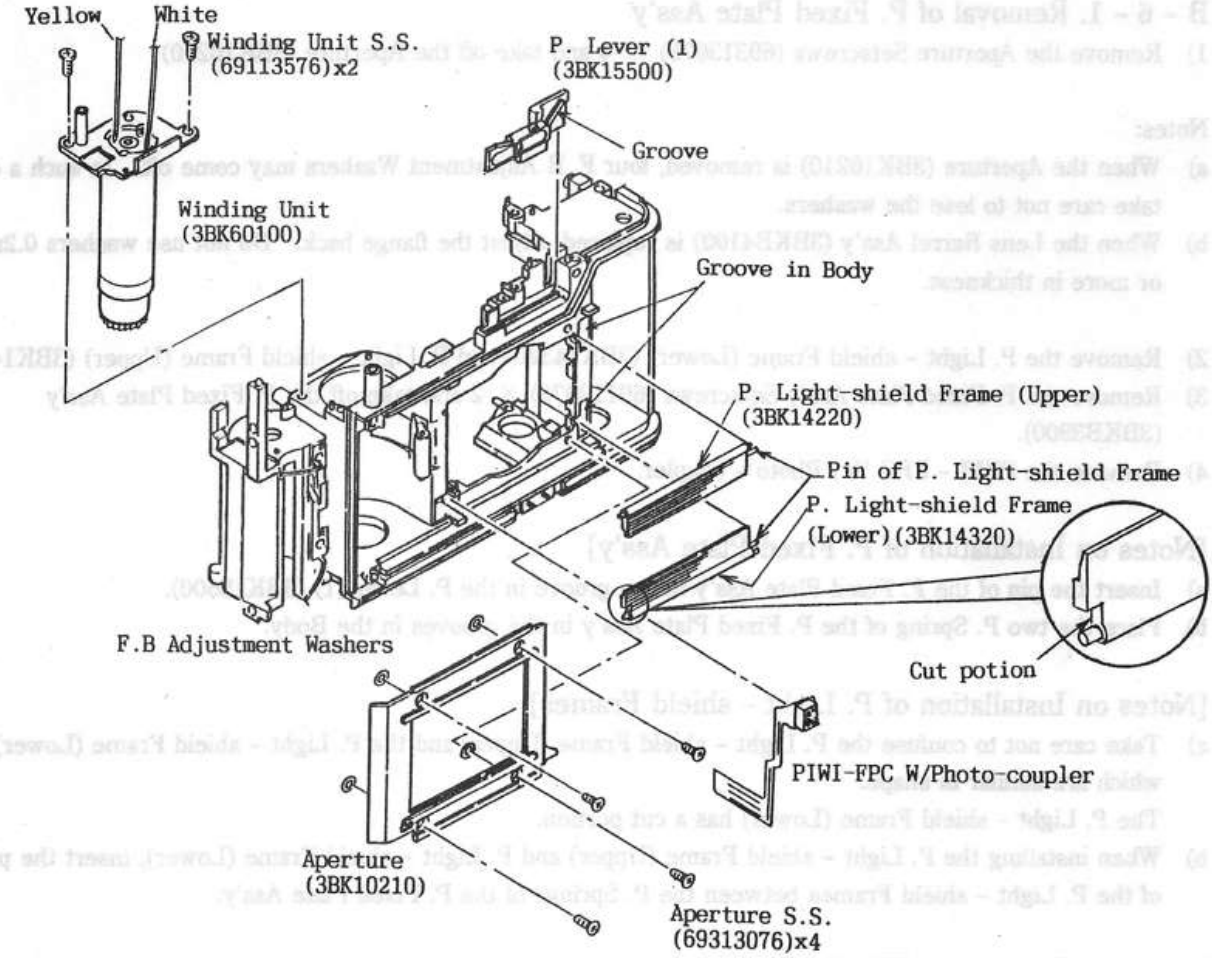


Fig.10

Removal of Other Parts



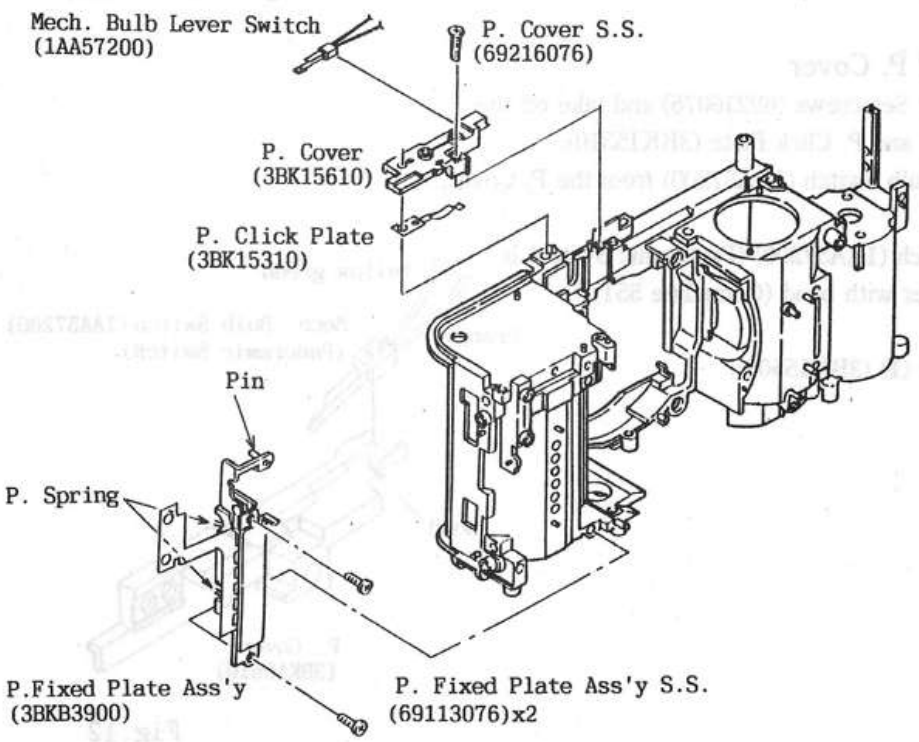


Fig.11

B - 6. REMOVAL OF OTHER PARTS

B - 6 - 1. Removal of P. Fixed Plate Ass'y

1) Remove the Aperture Setscrews (69313076) × 4 and take off the Aperture (3BK10210).

Notes:

a) **When the Aperture (3BK10210) is removed, four F. B Adjustment Washers may come off. In such a case, take care not to lose the washers.**

b) **When the Lens Barrel Ass'y (3BKB4100) is replaced, adjust the flange back. Do not use washers 0.2mm or more in thickness.**

2) Remove the P. Light - shield Frame (Lower) (3BK14320) and P. Light - shield Frame (Upper) (3BK14220).

3) Remove the P. Fixed Plate Ass'y Setscrews (69113076) × 2 and take off the P. Fixed Plate Ass'y (3BKB3900).

4) Remove the PIWI - FPC W / Photo - coupler.

[Notes on Installation of P. Fixed Plate Ass'y]

a) **Insert the pin of the P. Fixed Plate Ass'y in the groove in the P. Lever (1) (3BK15500).**

b) **Place the two P. Spring of the P. Fixed Plate Ass'y in the grooves in the Body.**

[Notes on Installation of P. Light - shield Frames]

a) **Take care not to confuse the P. Light - shield Frame (Upper) and the P. Light - shield Frame (Lower), which are similar in shape.**
The P. Light - shield Frame (Lower) has a cut portion.

b) **When installing the P. Light - shield Frame (Upper) and P. Light - shield Frame (Lower), insert the pins of the P. Light - shield Frames between the P. Springs of the P. Fixed Plate Ass'y.**

B - 6 - 2. Removal of Winding Unit

1) Remove the Winding Unit Setscrews (69113576) × 2 and take off the Winding Unit (3BK60100).

B - 6 - 3. Removal of P. Cover

1) Remove the P. Cover Setscrews (69216076) and take off the P. Cover (3BK15610) and P. Click Plate (3BK15310).

2) Remove the Mech. Bulb Switch (1AA57200) from the P. Cover.

* The Mech. Bulb Switch (1AA57200) (Panoramic Switch) is attached to the P. Cover with bond (Cemedine 551).

3) Remove the P. Lever (1) (3BK15500).

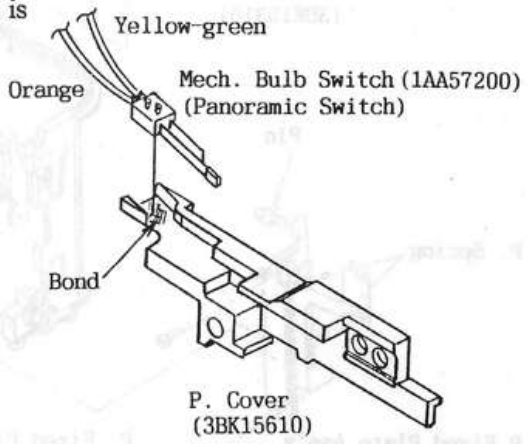


Fig.12

B - 7. INSTALLATION OF ASS'Y PARTS

B - 7 - 1. Assembly of Lens Barrel Ass'y

Notes:

a) **For assurance of performance, the Lens Barrel Unit will not be supplied as an independent part. Therefore, replace the Lens Barrel Ass'y when the Lens Barrel Unit is faulty.**

b) **The Cover Ring and Filter Frame can not be removed, since they are fixed to the Lens Barrel Unit with a special bond.**
The Cover Ring, Filter Frame and Lens Barrel Unit will not be supplied as independent parts. Therefore, replace the Lens Barrel Ass'y when any of them are faulty.

c) **There are two kinds of the lens cell moquettes, namely, Lens Cell Moquette (3BK23840) (t : 1.0mm) and Lens Cell Moquette (2) (3BK24700) (t : 0.5mm).**
Use the Lens Cell Moquette (2) to correct a heavy zoom operation torque.

* **Zoom operation torque : 300 ~ 600 gcm**

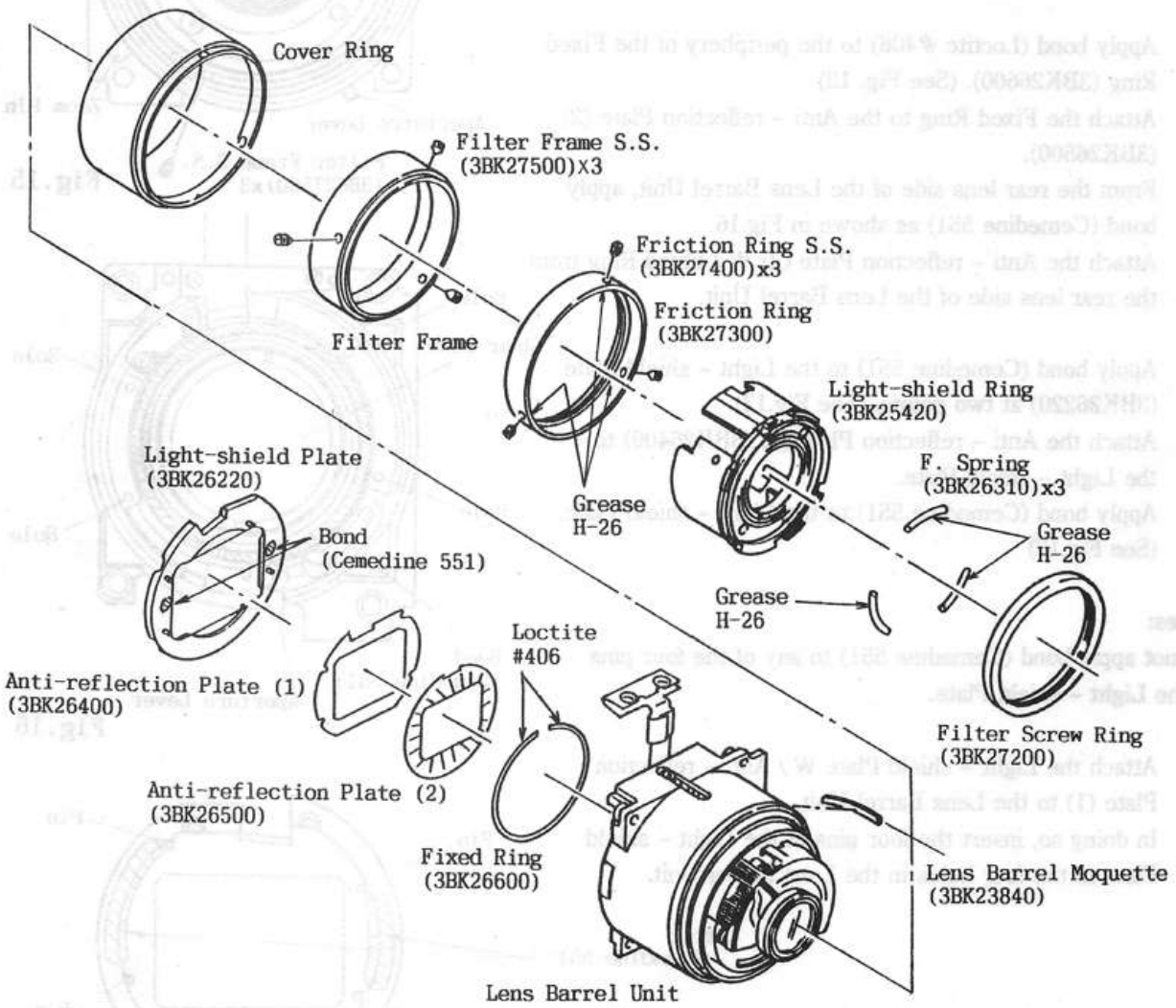


Fig.13

[Assembly of Lens Barrel Ass'y]

1) Install the Friction Ring (3BK27300) in the Light - shield Ring (3BK25420).
2) Set the F. Spring (3BK26310) × 3 in the Light - shield Ring. (See Fig.14)
3) Install the Filter Screw Ring (3BKB27200) and tighten the Friction Ring Setscrews (3BK27400) × 3.
4) Install the Light - shield Ring assembled above on the Lens Barrel Unit from the front lens side and tighten the Filter Frame Setscrews (3BK27500) × 3.

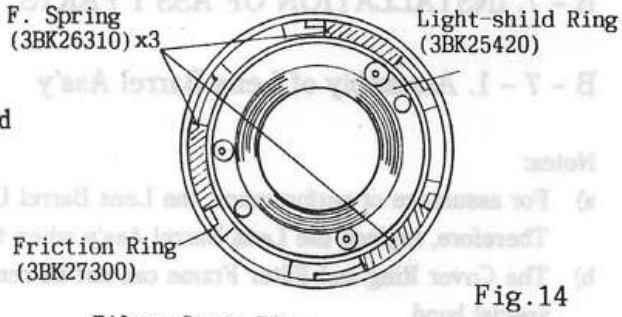


Fig.14

Notes:

a) Tighten the three Friction Ring Setscrews and three Filter Frame Setscrews evenly.

b) Apply Screw Lock 1401 to the heads of the three Friction Ring Setscrews and three Filter Frame Setscrews to lock them.

5) Apply bond (Loctite #406) to the periphery of the Fixed Ring (3BK26600). (See Fig. 13)
Attach the Fixed Ring to the Anti - reflection Plate (2) (3BK26500).
6) From the rear lens side of the Lens Barrel Unit, apply bond (Cemedine 551) as shown in Fig.16.
7) Attach the Anti - reflection Plate (2) W / Fixed Ring from the rear lens side of the Lens Barrel Unit.
8) Apply bond (Cemedine 551) to the Light - shield Plate (3BK26220) at two points. (See Fig.13)
Attach the Anti - reflection Plate (1) (3BK26400) to the Light - shield Plate.
9) Apply bond (Cemedine 551) to the Light - shield Plate. (See Fig.17)

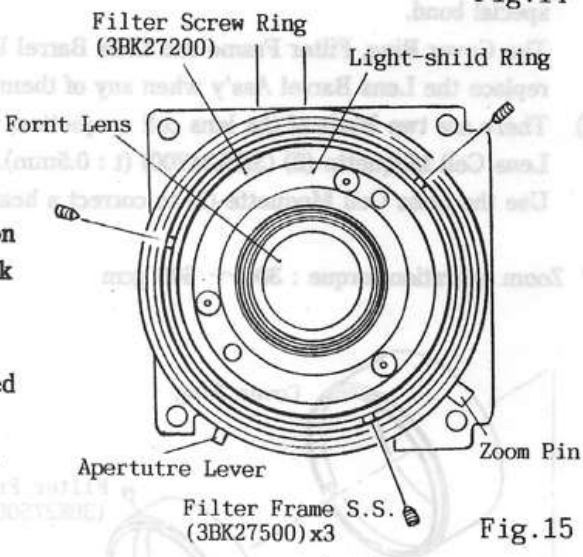


Fig.15

Notes:

Do not apply bond (Cemedine 551) to any of the four pins of the Light - shield Plate.

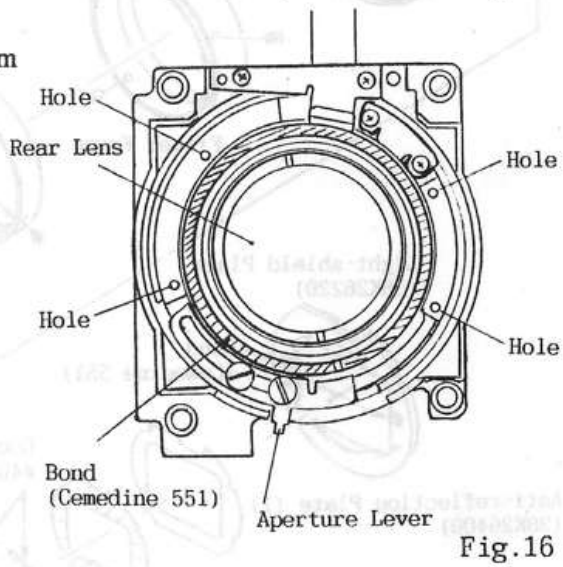


Fig.16

10) Attach the Light - shield Plate W / Anti - reflection Plate (1) to the Lens Barrel Unit.
In doing so, insert the four pins of the Light - shield Plate in the four holes in the Lens Barrel Unit.

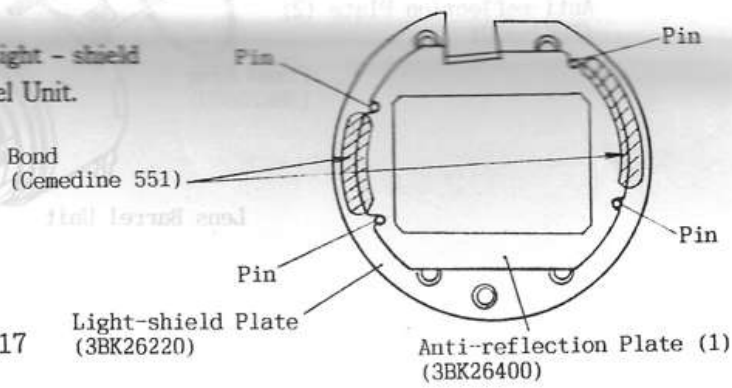


Fig.17

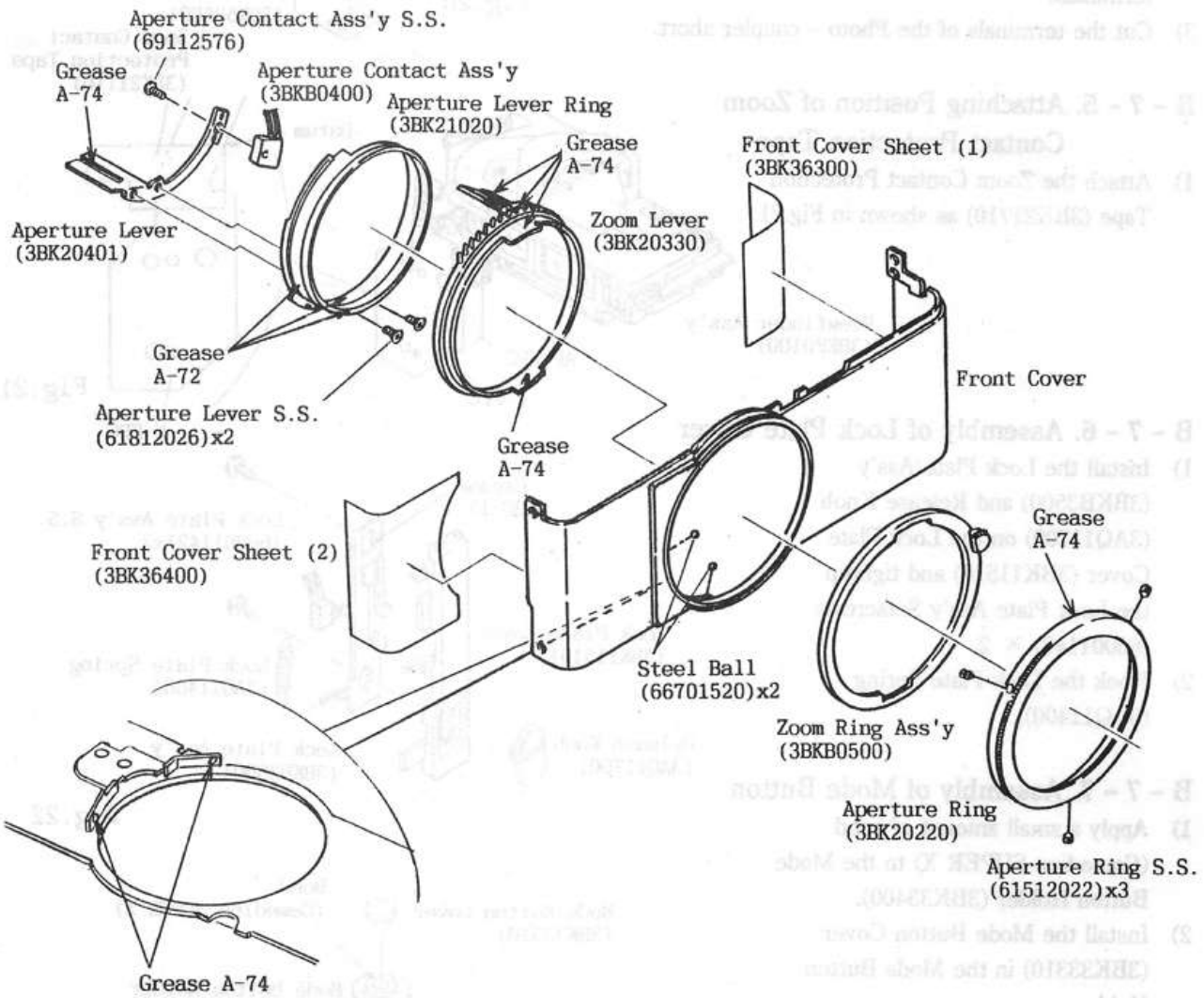
B - 7 - 2. Assembly of Front Cover Ass'y

1) Install the Aperture Contact Ass'y (3BKB0400) on the Aperture Lever (3BK20401) and tighten the Aperture Contact Ass'y Setscrew (69112576).
2) Install the Aperture Lever w / Aperture Contact Ass'y on the Aperture Lever Ring (3BK21020) and tighten the Aperture Lever Setscrews (61812026) × 2.
3) Install the Zoom Lever (3BK20330) on the Aperture Lever Ring.
4) Set the Steel Balls (66701520) × 2 in the Front Cover.
5) Install the Aperture Lever Ring W / Zoom Lever on the Front Cover.
6) Install the Zoom Ring Ass'y (3BKB0500) and Aperture Ring (3BK20220) on the Front Cover and tighten the Aperture Ring Setscrews (61512022) × 3.

Notes:

a) The Steel Balls can easily get lost. Take due care not to lose them.
b) Tighten the Aperture Ring Setscrews (61512022) × 3 evenly.
c) Apply Screw Lock 1401 to the heads of the Aperture Ring Setscrews to lock them.

7) Attach the Front Cover Sheet (2) (3BK36400) to the Front Cover.
8) Attach the Front Cover Sheet (1) (3BK36300) to the Front Cover.



* Grease A-74: Grease LOGNES LAMBDA A-74

Fig.18

B - 7 - 3 Assembly of Rewind Gear

1) Install the Rewind Gear (3BK60600), RW Fork Spring (39660300) and Rewind Fork (37862700) on the MM Base Plate Caulking Ass'y (3BKB4600).
2) Tighten the Rewind Fork Setscrews (66001042).

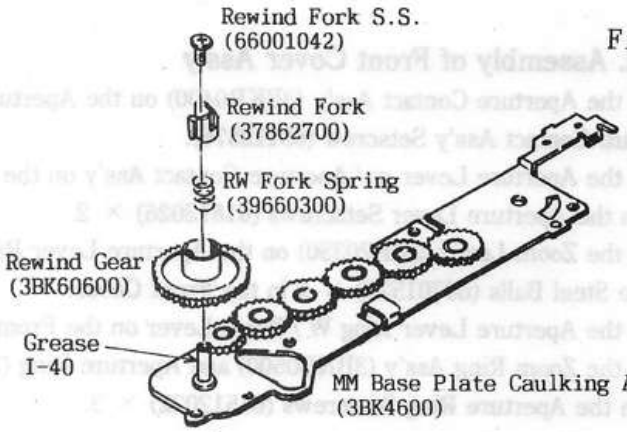


Fig.19

B - 7 - 4. Assembly of PIWI - FPC

1) Install the Photo - coupler (5ENCSG105F***01) in the PIWI Holder (3BK61510) so that the cut portion of the Photo - coupler is positioned as shown in Fig.20.
2) Install the PIWI Holder W / Photo - coupler by fitting the four terminals of the Photo - coupler in the holes in the PIWI - FPC (3BK50600) and solder the terminals.
3) Cut the terminals of the Photo - coupler short.

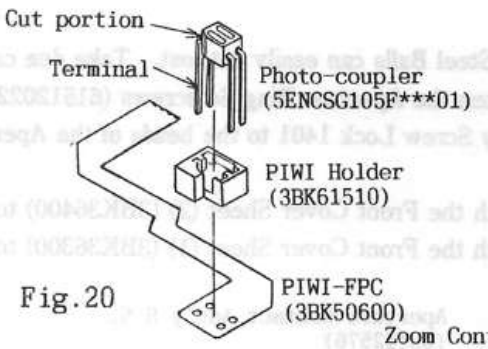


Fig.20

B - 7 - 5. Attaching Position of Zoom Contact Protection Tape

1) Attach the Zoom Contact Protection Tape (3BK21710) as shown in Fig.21.

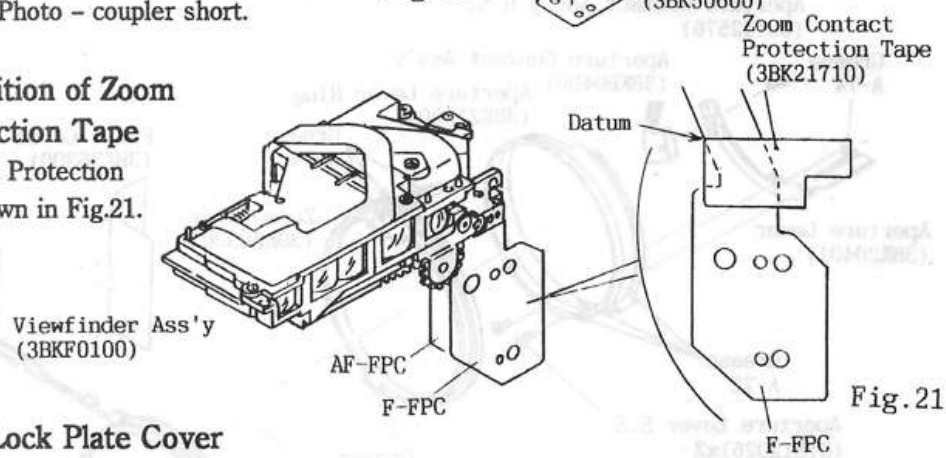


Fig.21

B - 7 - 6. Assembly of Lock Plate Cover

1) Install the Lock Plate Ass'y (3BKB3500) and Release Knob (3AQ11700) on the Lock Plate Cover (3BK11510) and tighten the Lock Plate Ass'y Setscrews (66001142) × 2.
2) Hook the Lock Plate Spring (3AQ11400).

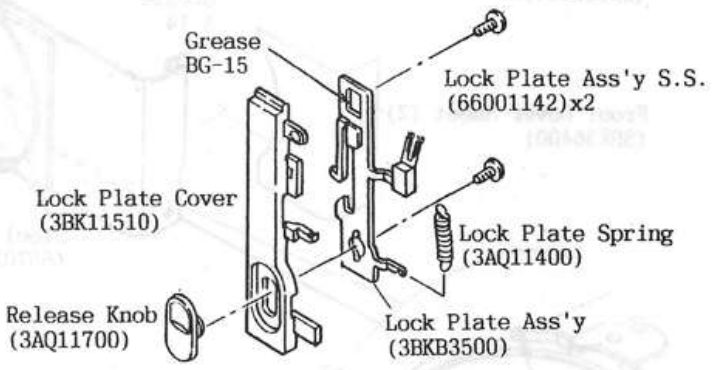


Fig.22

B - 7 - 7. Assembly of Mode Button

1) Apply a small amount of bond (Comedine SUPER X) to the Mode Button Holder (3BK33400).
2) Install the Mode Button Cover (3BK33310) in the Mode Button Holder.

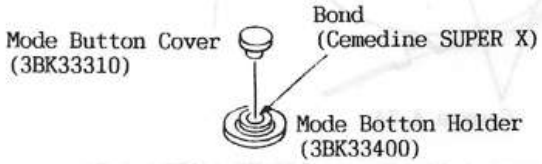


Fig.23

B - 7 - 8. How to Attach Window Glasses of Top Cover Ass'y

Notes:

a) **The window glasses of the Top Cover Ass'y are attached with UV bond (ultraviolet bond). The UV bond can not be supplied for use at repair. Use epoxy resin bond instead of the UV bond at repair.**

b) **Epoxy resin bond hardens slowly. Be sure to wait until the bond hardens completely and then install the Top Cover Ass'y on the Body. (Wait for 24 hours.)**

c) **To remove the UV bond, heat the bond with a dryer for a while and scrape off the UV bond with an NT cutter. In doing so, take care that other window glasses will not be affected by overheating with the dryer.**

d) **Take care not to deposit bond too high. (See Fig. 25) Also take care not to soil the window glasses with bond.**

e) **⊘ mark : Apply epoxy resin bond.**

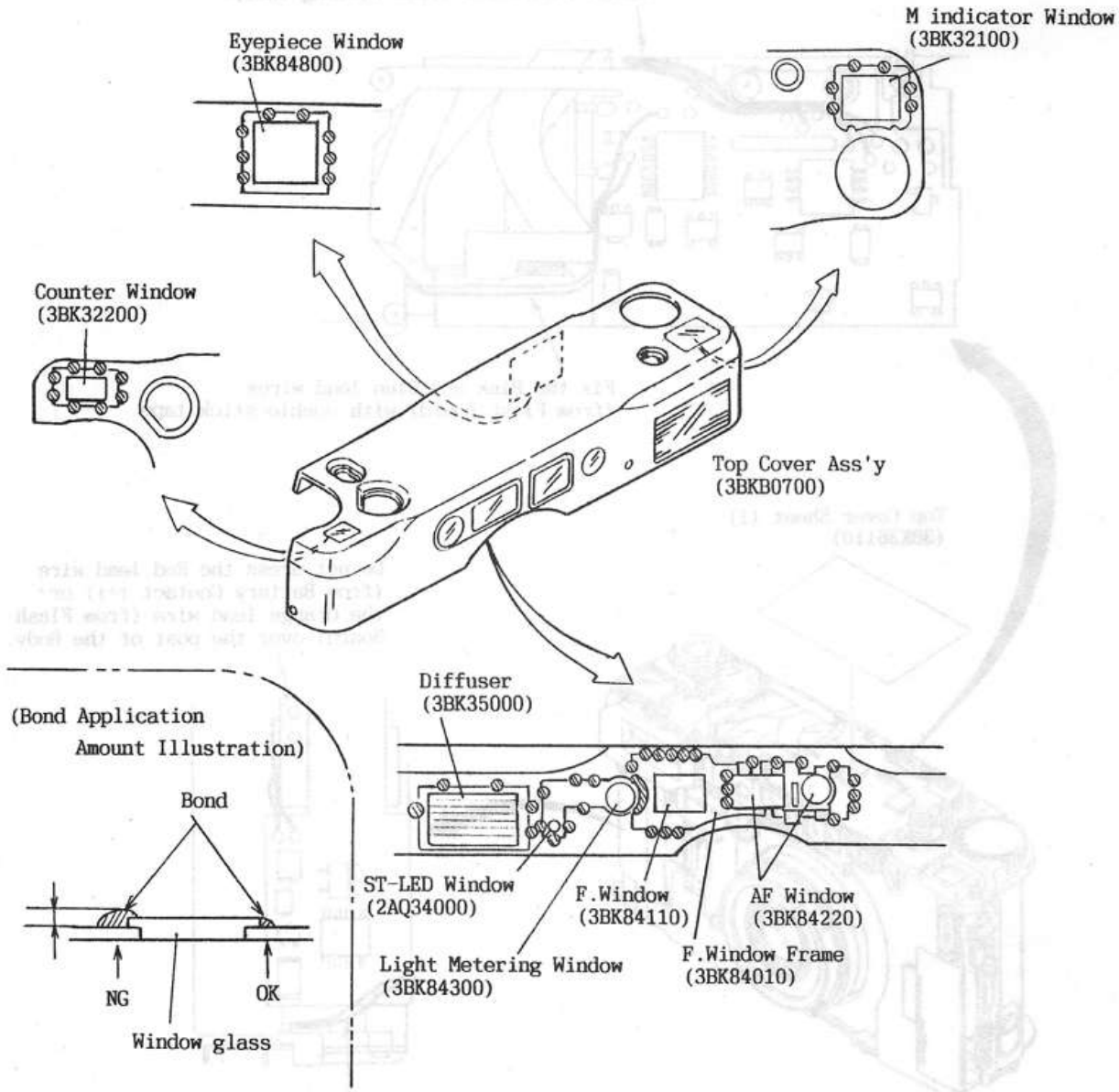


Fig.24

Fig.25

B - 8. DRESSING OF LEAD WIRES

B - 8 - 1. Dressing of Lead Wires

1) Dress the lead wires as follows:

Notes:

a) **Since there is little space between the Body and the Top Cover Ass'y, do not dress the lead wires over any electric parts.**

b) **Fix the lead wires with double - stick tape.**

c) **Fix the lead wires situated over the Body with the Top Cover Sheet (1) (3BK36110). In doing so, make sure that the lead wires are not positioned over any electric parts.**

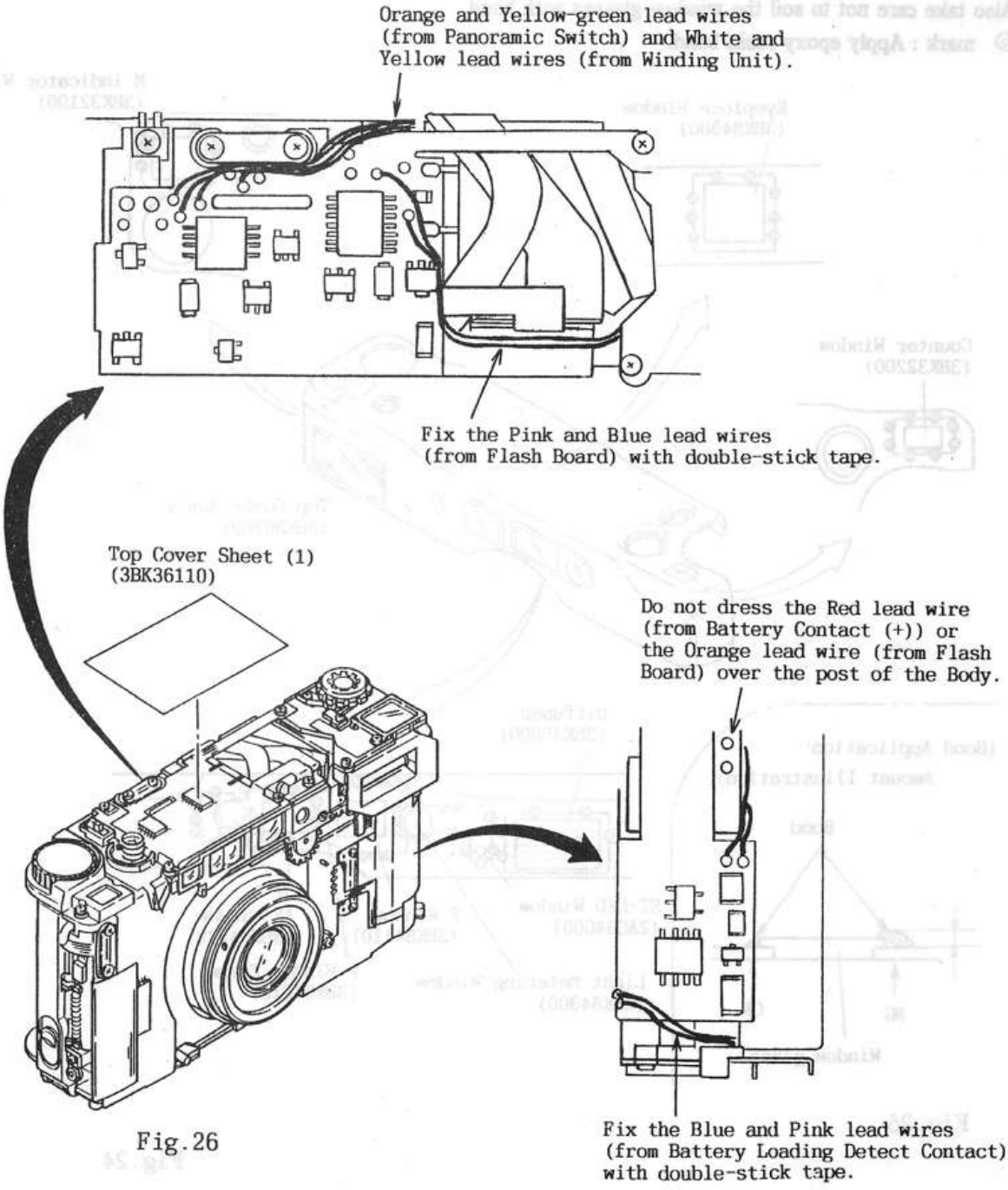

Orange and Yellow-green lead wires
(from Panoramic Switch) and White and
Yellow lead wires (from Winding Unit).
Fix the Pink and Blue lead wires
(from Flash Board) with double-stick tape.
Top Cover Sheet (1)
(3BK36110)
Do not dress the Red lead wire
(from Battery Contact (+)) or
the Orange lead wire (from Flash
Board) over the post of the Body.
Fix the Blue and Pink lead wires
(from Battery Loading Detect Contact)
with double-stick tape.

Fig.26

B - 9. DISASSEMBLY OF DATA BACK

B - 9 - 1. Removal of Date Module

1) Disassemble the Data Back in the following numerical order:

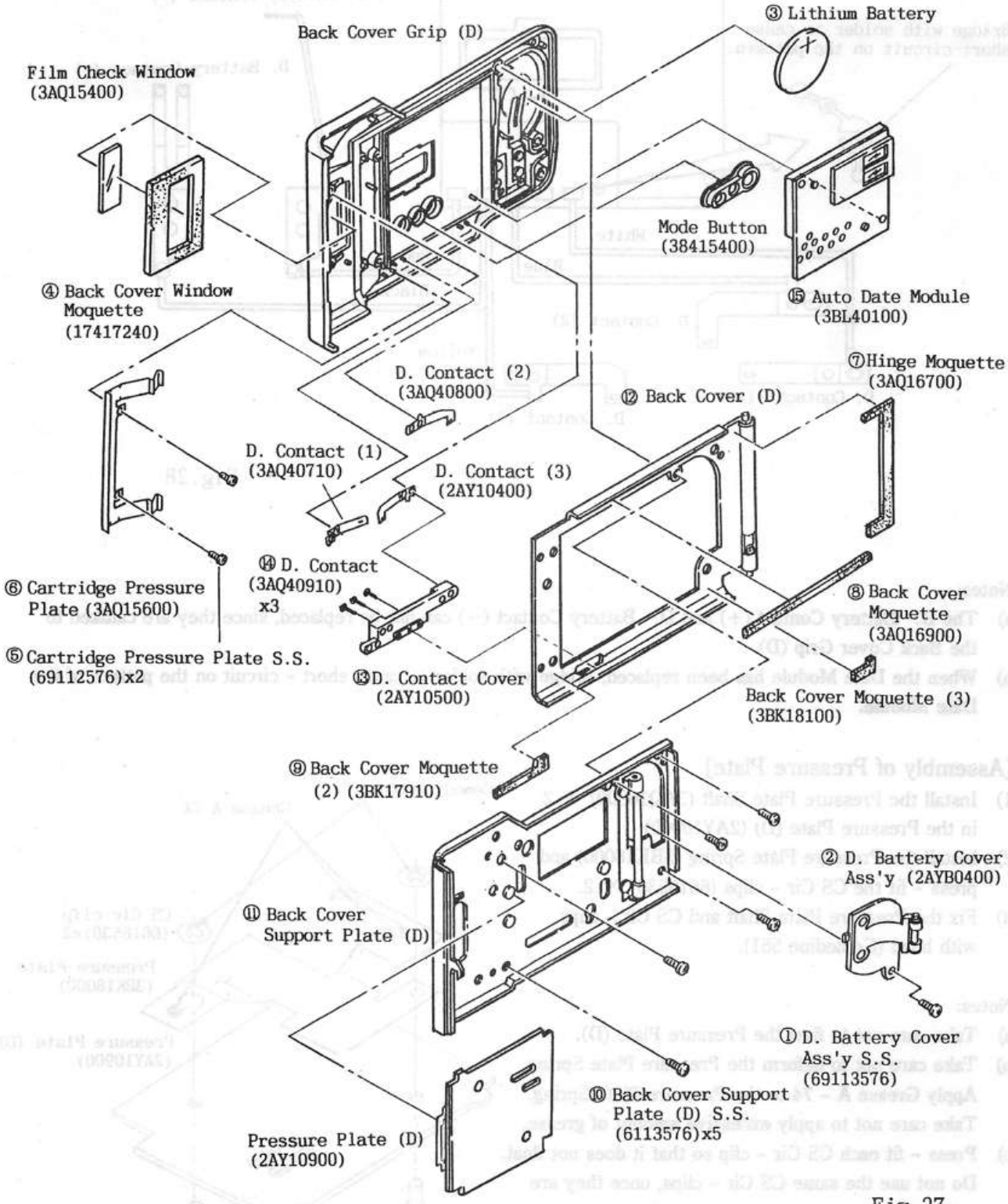


Fig.27

[Data Back Wiring Diagram]

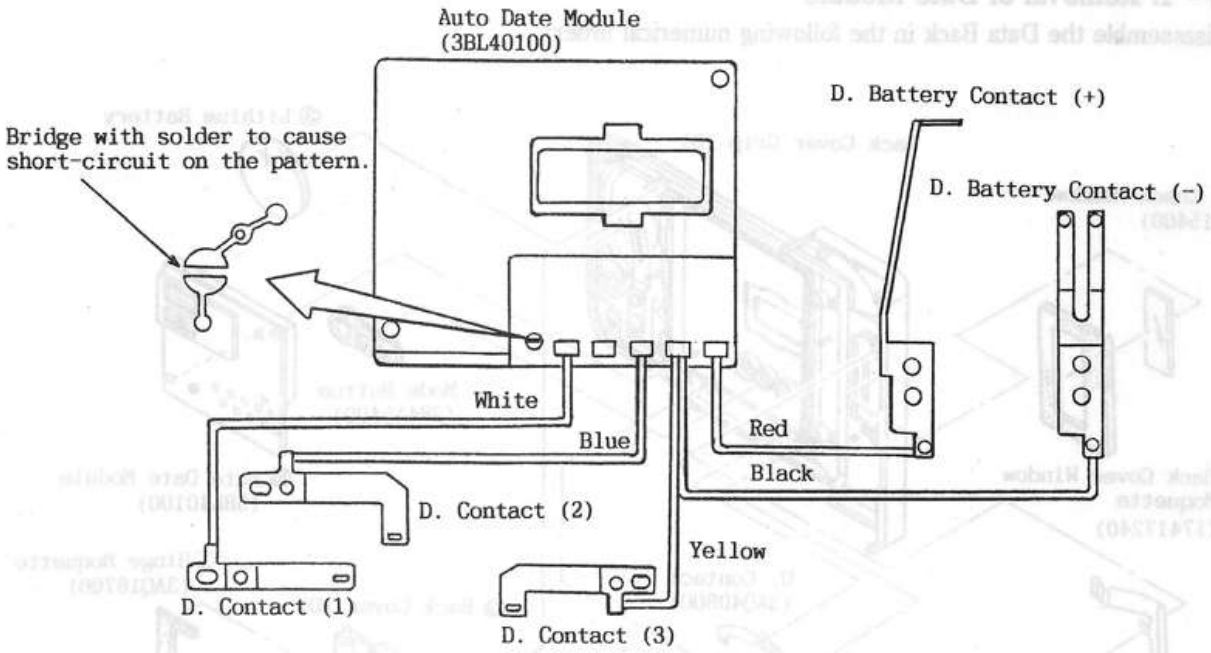


Fig.28

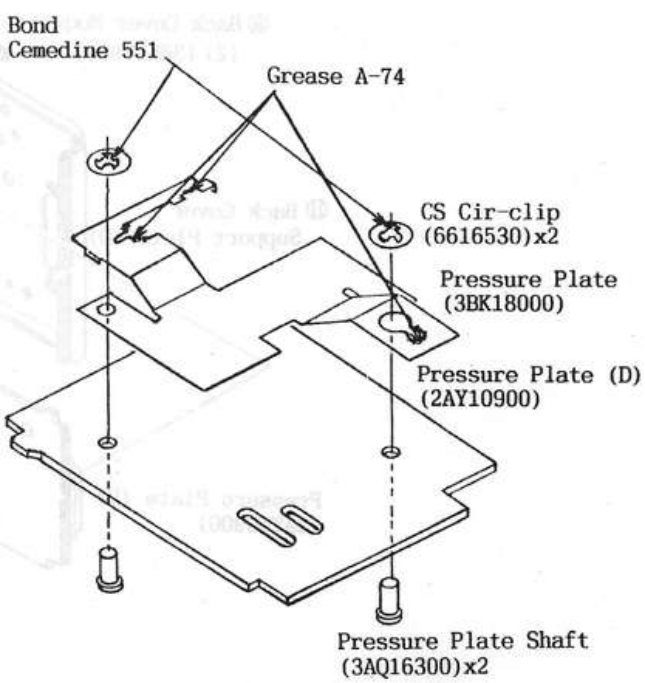
Notes:

a) **The D. Battery Contact (+) and D. Battery Contact (−) can not be replaced, since they are caulked to the Back Cover Grip (D).**

b) **When the Date Module has been replaced, bridge with solder to cause short - circuit on the pattern of the Date Module.**

[Assembly of Pressure Plate]

1) Install the Pressure Plate Shaft (3AQ16300) × 2 in the Pressure Plate (D) (2AY10900).
2) Install the Pressure Plate Spring (3BK18000) and press - fit the CS Cir - clips (6616530) × 2.
3) Fix the Pressure Plate Shaft and CS Cir - clips with bond (Cemedine 551).



Notes:

a) **Take care not to flaw the Pressure Plate (D).**

b) **Take care not to deform the Pressure Plate Spring. Apply Grease A - 74 to the Pressure Plate Spring. Take care not to apply excessive amount of grease.**

c) **Press - fit each CS Cir - clip so that it does not float. Do not use the same CS Cir - clips, once they are used.**

■ PARTS MODIFICATION LIST

[1] Modification of Front Cover Ass'y

To eliminate the gap between the Top Cover Ass'y and the Front Cover Ass'y, the Front Cover Spacer (3BK37200) and Spacer Holder (3BK37300) have been installed provisionally on the Front Cover Ass'y. In the permanent design, the cut portion of the Front Cover will be eliminated and the Front Cover Spacer (3BK37200) and Spacer Holder (3BK37300) will be disused.

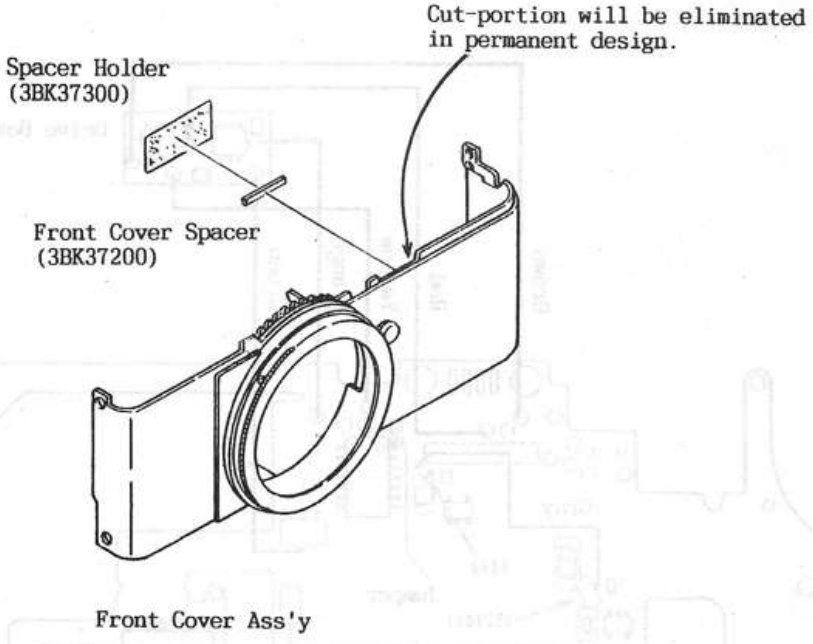


Fig.29

[2] Modification of Main FPC Ass'y

In this camera, the Main FPC Ass'y was modified in the course of production to improve the quality. The instructions given in this Repair Manual are generally intended for repair of the new type product. Perform the repair of the old type product as follows:

(A) Drive Board

At the early stage of production, some cameras were provided with a Drive Board for the shutter circuit compensation to improve the shutter drive performance. Therefore, due care must be taken when such a camera is to be repaired.

New type cameras, whose Main FPC Ass'y has been improved, is not provided with the Drive Board.

a) Lead wire connection diagram

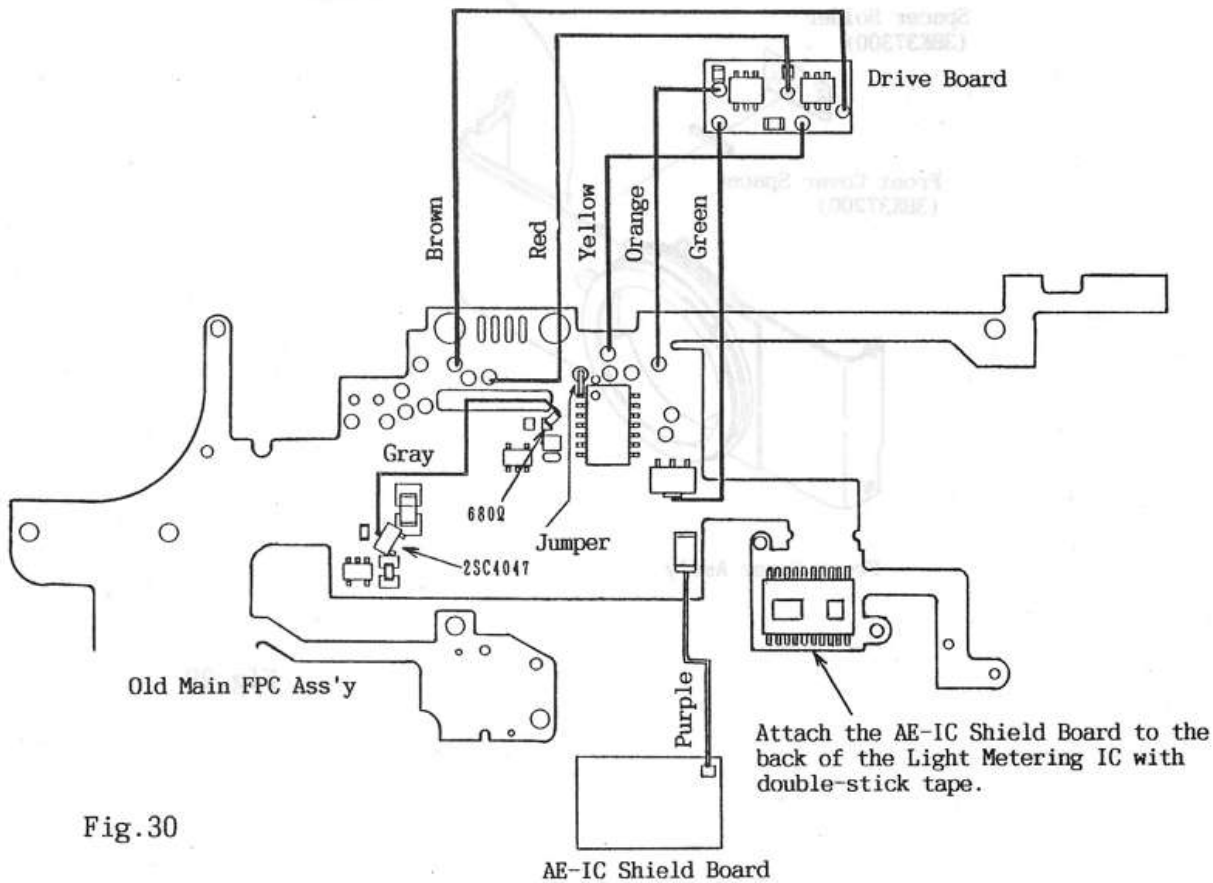


Fig.30

b) Repair Information

No old type Main FPC Ass'y will be supplied.

Only the new type Main FPC Ass'y is available. When replacing the Main FPC Ass'y, remove the Drive Board. Also remove the five lead wires soldered to the Drive Board.

c) Notes on dressing of lead wires.

Do not dress the lead wires over any electric parts.

Fix the lead wires with the Top Cover Sheet (1) (3BK36110).

(Lead Wires Dressing Illustration)

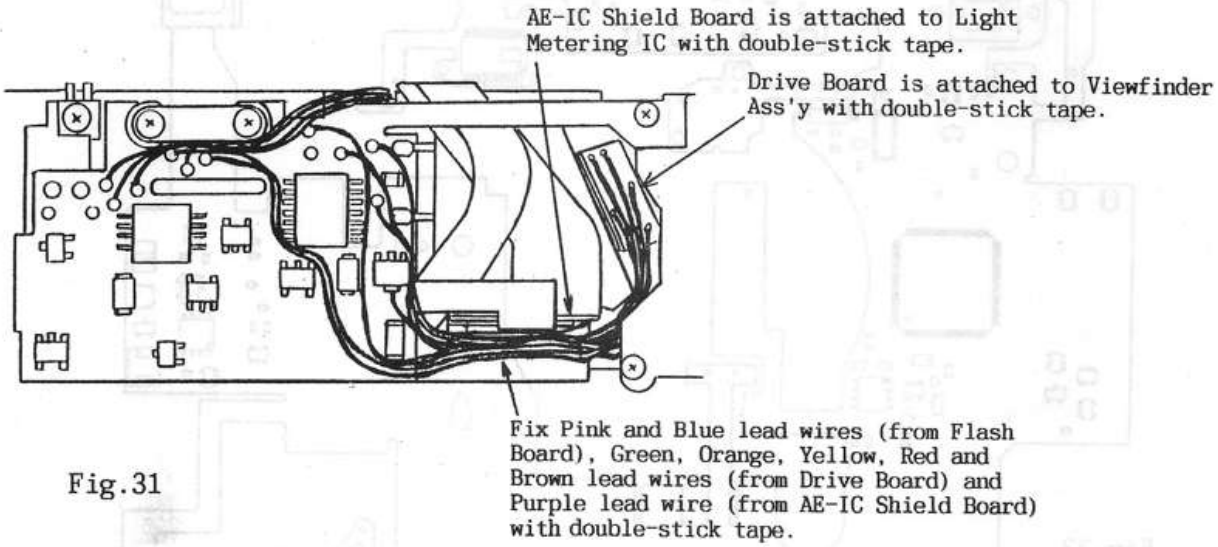

AE-IC Shield Board is attached to Light Metering IC with double-stick tape.
Drive Board is attached to Viewfinder Ass'y with double-stick tape.
Fix Pink and Blue lead wires (from Flash Board), Green, Orange, Yellow, Red and Brown lead wires (from Drive Board) and Purple lead wire (from AE-IC Shield Board) with double-stick tape.

Fig.31

(B) AE - IC Shield Board

At the early stage of production, some cameras were provided with the AE - IC Shield Board, which is attached to the Main FPC Ass'y with double - stick tape. In new type cameras, however, the AE - IC Shield Board is disused to improve productivity.

a) Lead wire connection diagram

See Fig. 30

b) Repair Information

The AE - IC is not used with the new Main FPC Ass'y.

When installing a new type Main FPC Ass'y in place of the old type one, fold the Main FPC in the direction of A as shown in Fig.32 and attach it to the back of the Light Metering IC with double stick tape.

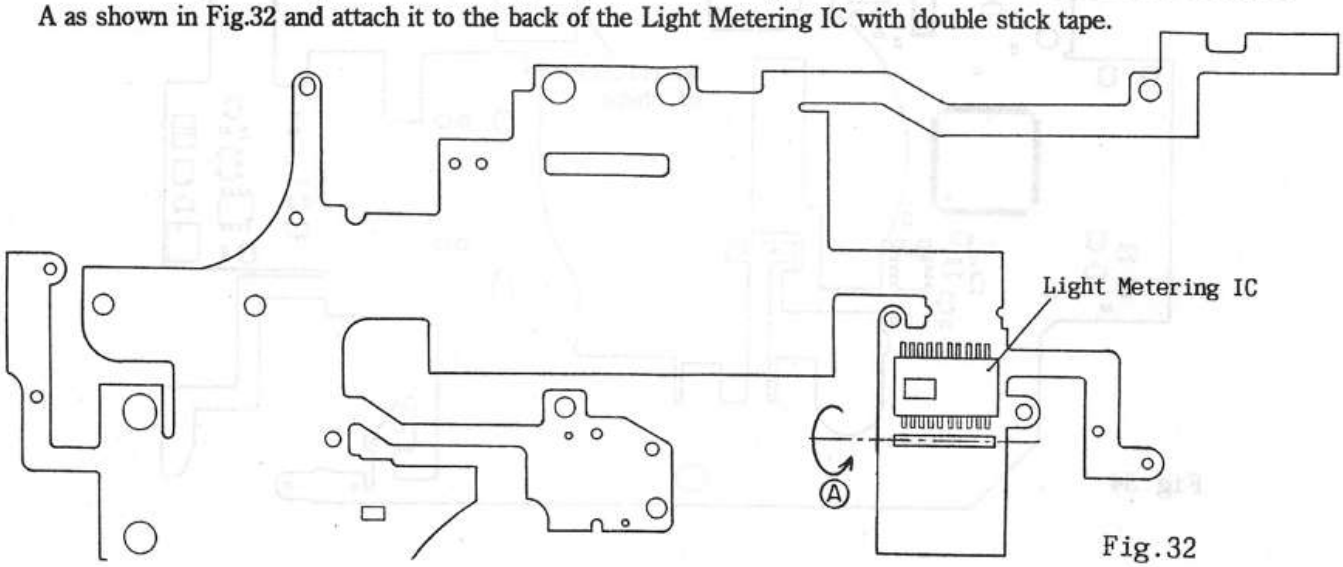


Fig.32

[Distinction between Old Main FPC Ass'y and New Main FPC Ass'y]

(Old Main FPC Ass'y)

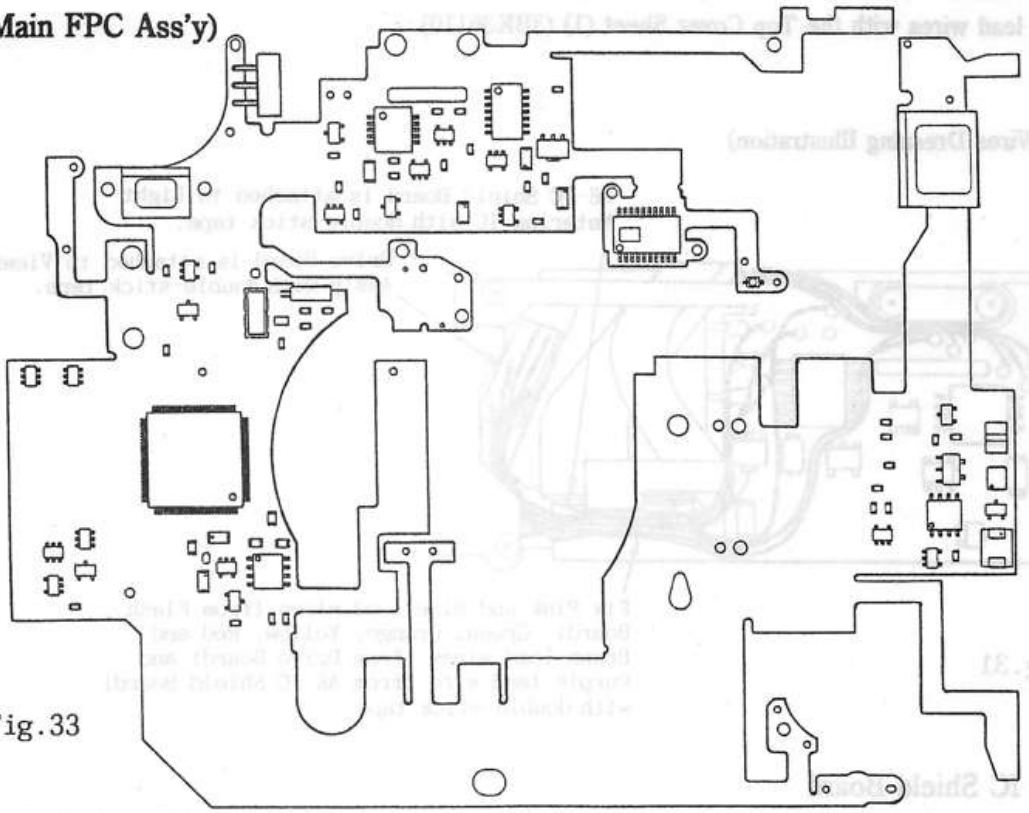


Fig.33

(New Main FPC Ass'y)

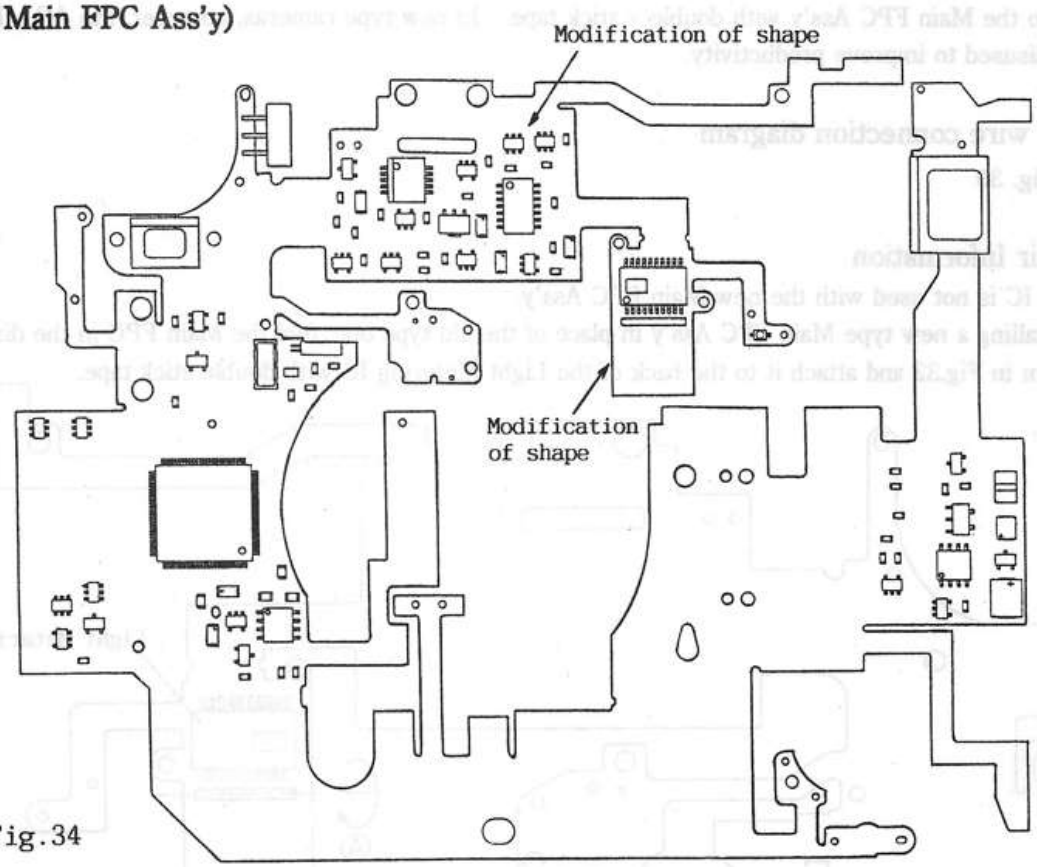


Fig.34

[3] Modification of PIWI FPC

The shape of the PIWI FPC was modified to improve operation efficiency.
The old PIWI FPC (3BK50600) and the new PIWI FPC (3BK50610) are interchangeable with each other.

a) Repair Information

The PIWI FPC soldering method must be modified as shown in Fig. 35.

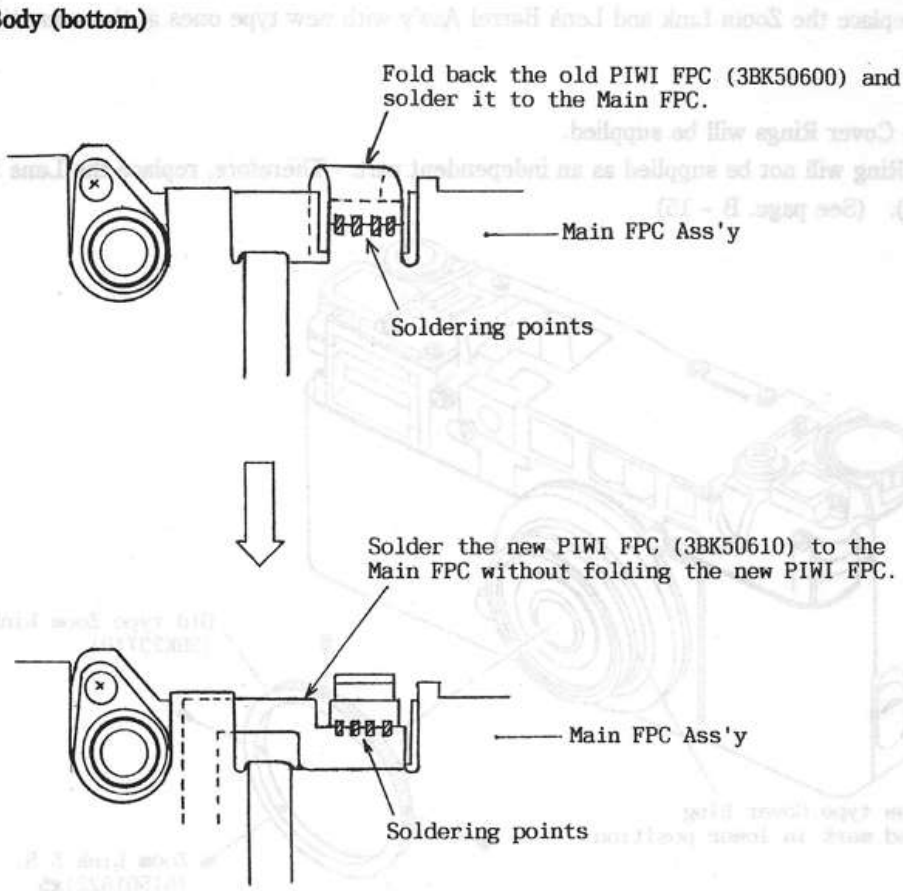

Body (bottom)
Fold back the old PIWI FPC (3BK50600) and solder it to the Main FPC.
Main FPC Ass'y
Soldering points
Solder the new PIWI FPC (3BK50610) to the Main FPC without folding the new PIWI FPC.
Main FPC Ass'y
Soldering points

Fig.35

[4] Modification of Zoom Link and Cover Ring

The Zoom Link and Cover Ring were modified to improve workability and operation efficiency.

a) Modification

In about 7,500 cameras at the early stage of production, the Zoom Link was locked with five setscrews. In new type products, however, the Zoom Link is locked with four setscrews.

b) Repair Information

Zoom Links and Cover Rings are not interchangeable between the old type and the new type. At repair, therefore, replace the Zoom Link and Lens Barrel Ass'y with new type ones at the same time.

Notes:

a) **No old type Cover Rings will be supplied.**

b) **The Cover Ring will not be supplied as an independent part. Therefore, replace the Lens Barrel Ass'y (3BKB4100). (See page. B - 15)**

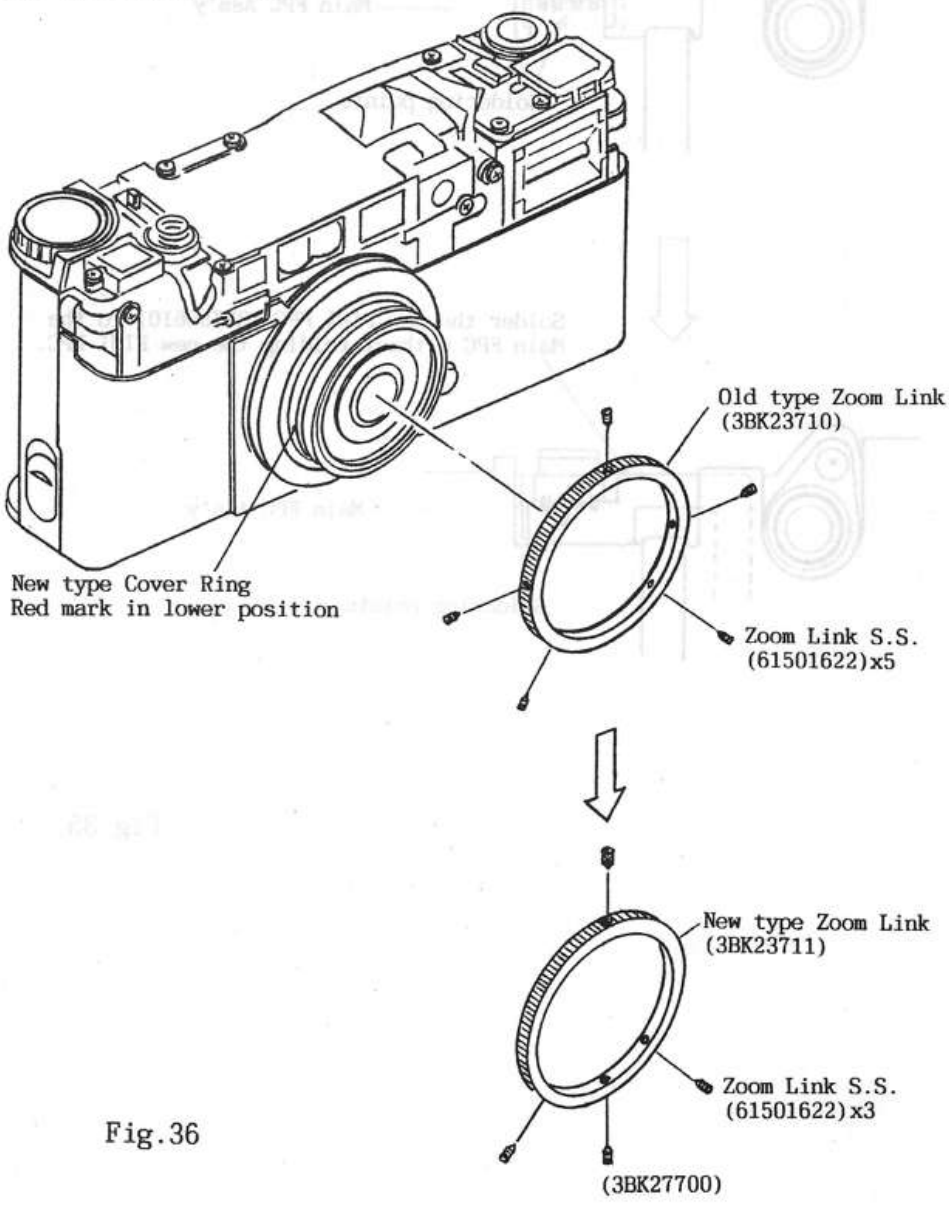


Fig.36

[5] Modification of CPU

The CPU will be modified for easier automatic adjustments (make use of the factory) and manual adjustments (make use of servise).

a) Repair Information

This modification relates to adjustment software, but does not relate to the camera performance.
The CPU (Main FPC Ass'y) is interchangeable between the old type and the new type. Therefore, the modification of CPU will not require any repair.

b) Time for modification

Around February 1994

c) Distinction between old CPU and new CPU

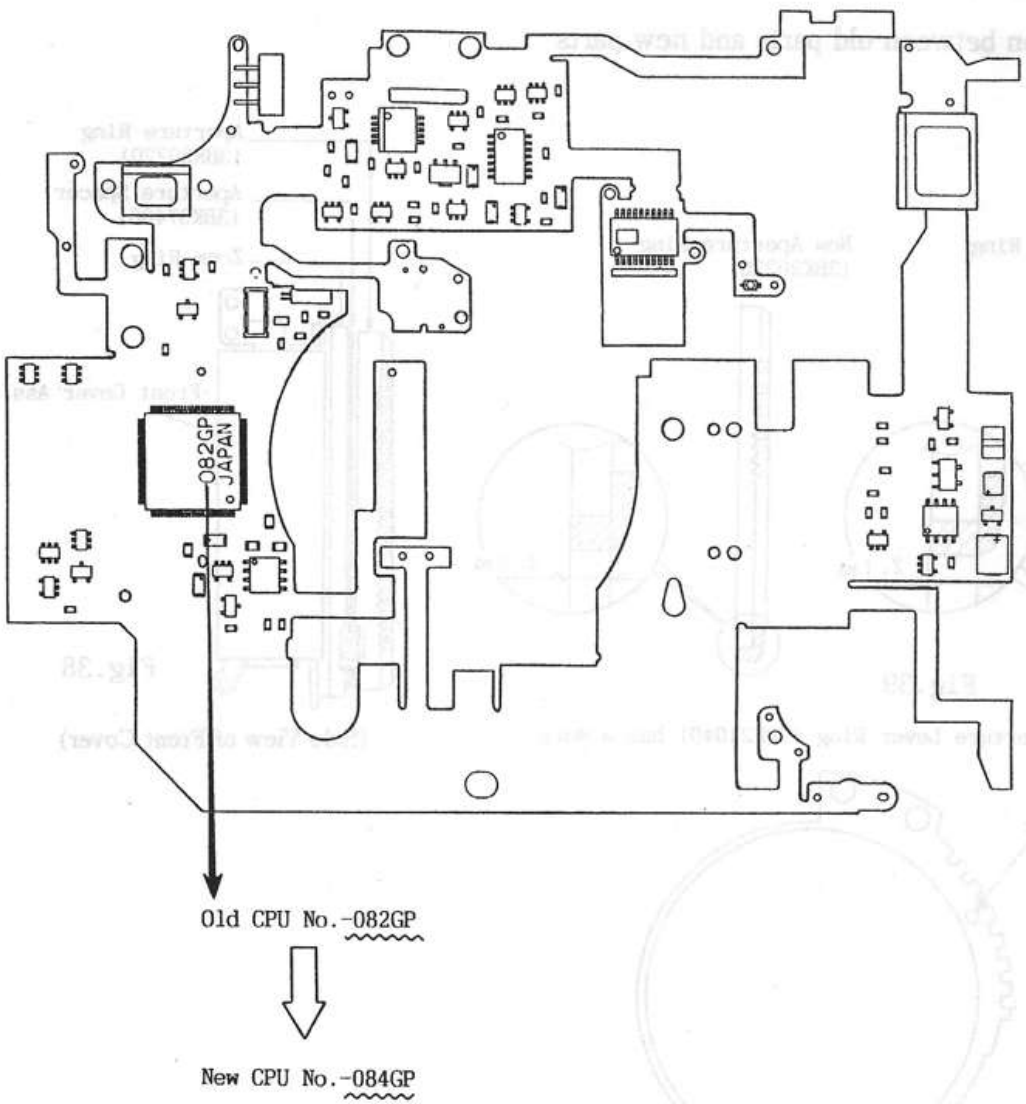


Fig.37

[6] Modification of Aperture Ring and Aperture Lever Ring

The Aperture Ring and Aperture Lever Ring were modified to feel better the turning of the Aperture Ring.

a) Modification

Modification of dimensions of Aperture Ring and Aperture Lever Ring.

b) Repair Information

See the table below for interchangeability:

	Aperture Ring (3BK20210)	Aperture Ring (3BK20220)
Aperture Lever Ring (3BK21030)	Usable *1	Usable if Aperture Spacer (3BK37400) is added *2
Aperture Lever Ring (3BK21040)	Not usable	Usable *3

*1: Initial production
*2: Modified in the course of production add Aperture Spacer (3BK37400) to eliminate play, if any, of Aperture Ring. (See Fig. 38)
*3: Permanent production

c) Distinction between old parts and new parts

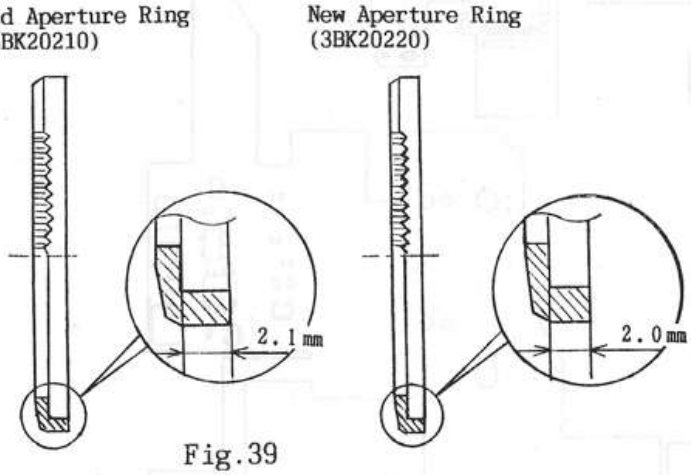


Fig.39

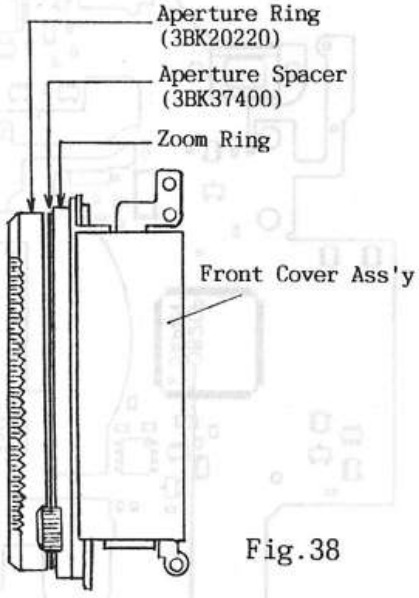


Fig.38

(Side View of Front Cover)

The new Aperture Lever Ring (3BK21040) has a mark.

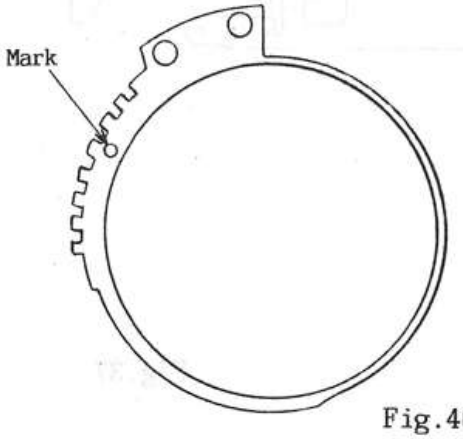


Fig.40

[Notes on Repair]

* **When replacing the Lens Barrel Ass'y or Main FPC Ass'y, observe the following instructions:**

(A) When replacing Main FPC Ass'y (3BKE0100)

a) If Shutter FPC has markings
Bridge with solder to cause short - circuit on the pattern of the Main FPC Ass'y.

b) If Shutter FPC has no markings
There is no need to bridge with solder to cause short - circuit on the pattern of the Main FPC Ass'y.

(B) When replacing Lens Barrel Ass'y (3BKB4100)

a) If Shutter FPC has markings
Bridge with solder to cause short - circuit on the pattern of the Main FPC Ass'y.

b) If Shutter FPC has no markings
Remove the solder, if any, which bridges to cause the short - circuit on the pattern of the Main FPC Ass'y.

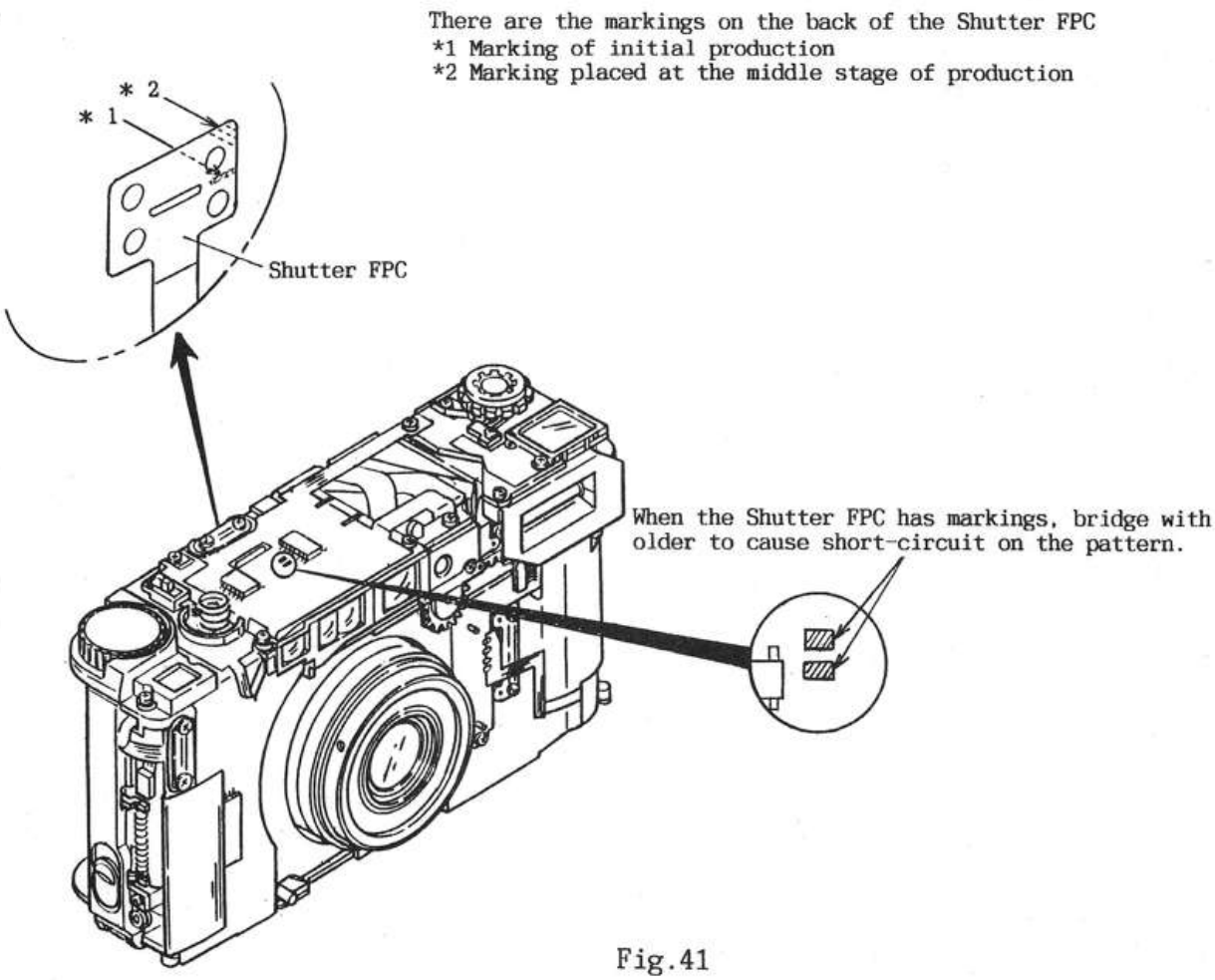

There are the markings on the back of the Shutter FPC
*1 Marking of initial production
*2 Marking placed at the middle stage of production
* 2
* 1
Shutter FPC
When the Shutter FPC has markings, bridge with older to cause short-circuit on the pattern.

Fig.41

C. ADJUSTMENT PROCEDURES, ETC.

C - 1. ADJUSTMENT PROCEDURES

C - 1 - 1. Description of Manual Adjusting Modes

Outline

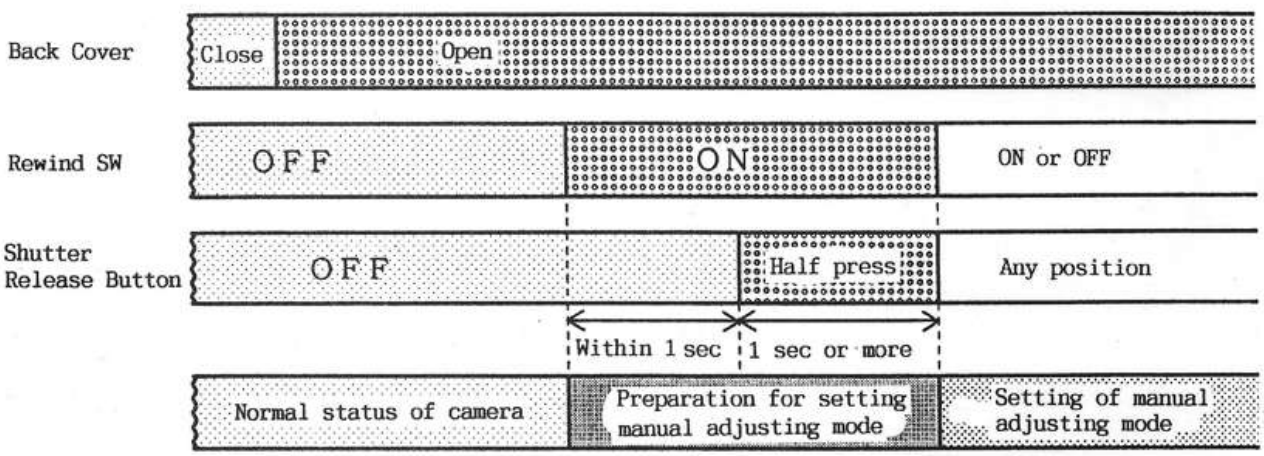
Manual adjusting modes are used when the data are to be adjusted by manual operation. Also the errors of the camera are displayed in a manual adjusting mode.

Setting of Manual Adjusting Mode

① Open the Back Cover. (The Zoom Ring, Focus Dial and Aperture Ring may be in any positions.) During manual test mode, keep the Back Cover open.

② Press the Mid - roll Rewind Button (turn on the Rewind Switch) and press the Shutter Release Button halfway down (Check Switch ON) within 1 sec. while keeping the Rewind Switch pressed. After the passage of 1 sec. under these conditions, the first manual adjusting mode will be set.

Note:
If the Shutter Release Button is pressed all the way to such a degree that the Release Switch is turned on, the camera does not enter the first manual adjusting mode.



At transition to the manual adjusting mode, the first shot count display mode will be set on the LCD Panel.

Completion of Manual Adjusting Mode

In any status during a manual adjusting mode, at the closing of the Back Cover, the operation is stopped immediately and all the back - up data on RAM are written in EEPROM. At this point, the displays and mode will return to the same conditions as those after a reset start.

Kinds of Manual Adjusting Modes

The kinds of manual adjusting modes are as listed below. The manual adjusting mode first set is the shot count display mode. The subsequent transitions to other modes are accomplished in the order shown by the arrows below, from top to bottom, by turning on the Rewind Switch in each mode. After the AF data display mode, the shot count display mode comes again.

	Mode Display	Exposure Counter (Display at Mode Setting)	Mode and Outline
Start		34	Shot count display mode (first manual adjusting mode) Shutter operation count is displayed on exposure compensation display and exposure counter.
	EE	Error code 00	Error display mode Camera error is displayed in code.
	oP	No. ON / OFF 10	Option setting rewrite mode Change of option setting by user is allowed.
	00	Data 00	Adjusted value correction mode Read and rewrite of any EEPROM data are allowed.
	Ad	Item 2L Blinking ↔ Data 60	A / D value display mode A / D value at A / D conversion port is displayed.
	Fb	Adjusted value 00	Infinity position (FB) adjusting mode Infinity position (FB) can be adjusted.
	LU	Light metering result 72	Light metering value display mode A / D value of light metering result and LV code are displayed.
	AE	Adjusted value of light exposure 00	Light exposure adjusting mode Light exposure can be adjusted.
	SH	Adjusted value of shutter delay 00	Shutter delay adjusting mode Shutter delay can be adjusted.
	AF	AF data 82	AF data display mode Distance metering result is dispayed.

Shot Count Display Mode

Purpose

The total number of shots counted after production of the camera can be known.

Display

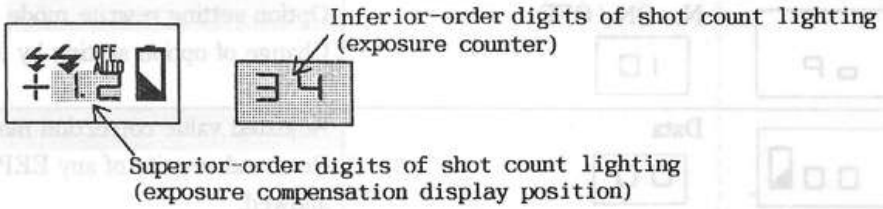
The manual adjusting mode first set is this mode, in which the following displays appear:

Flash mode display :

Exposure compensation display :

Battery check display :

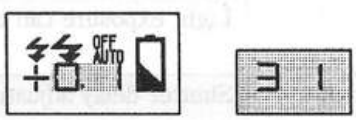
All lighting


Inferior-order digits of shot count lighting
(exposure counter)
Superior-order digits of shot count lighting
(exposure compensation display position)

Calculation of the Number of Shots

A tenth of the total number of shots counted after production of the camera is displayed at the exposure compensation display position and exposure counter; two superior - order digits at the exposure compen - sation display position and two inferior - order digits at the exposure counter. Therefore, the actual shot count is ten times this value.

Example: When exposure compensation display = 01, exposure counter display = 31



The shot count, which is ten times the displayed value, is calculated as
Number of shots = 0131 × 10 = 1310 shots

Allowable Range of Displayed Shot Count

The range of displayed values is 0000 ~ 6553. The range of displayed shot count, which is ten times this value, is 00000 ~ 65530.
Shot count increment is performed at the end of winding.

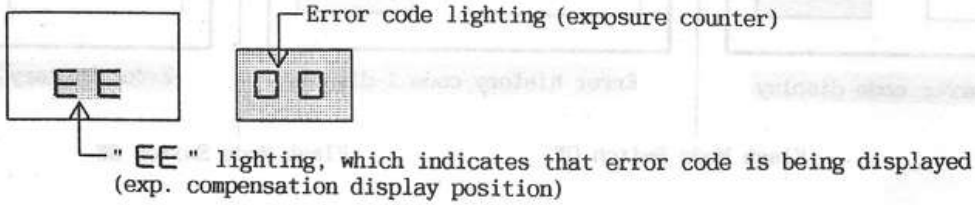
Error Code (Error History) Display Mode

Purpose

The current error and the errors in the past can be known.

Display

Turn on the Rewind Switch in the shot count display mode, and the camera will enter the current error code display mode. In this mode, " EE " which indicates that an error code is now being displayed, appears at the exposure compensation display position and an error is displayed at the exposure counter.


Error code lighting (exposure counter)
EE
00
" EE " lighting, which indicates that error code is being displayed
(exp. compensation display position)

Description of Current Error Code

When " EE " is displayed at the exposure compensation display position, the number displayed at the exposure counter represents the current error code.

Error kind	Display		Description of error
	Exposure compensation display position	Exposure counter	
Current error	EE	00	No abnormality
		01~05	Battery voltage down during operation (battery replacing indication, not error)
		06	Shutter photo - coupler signal abnormal

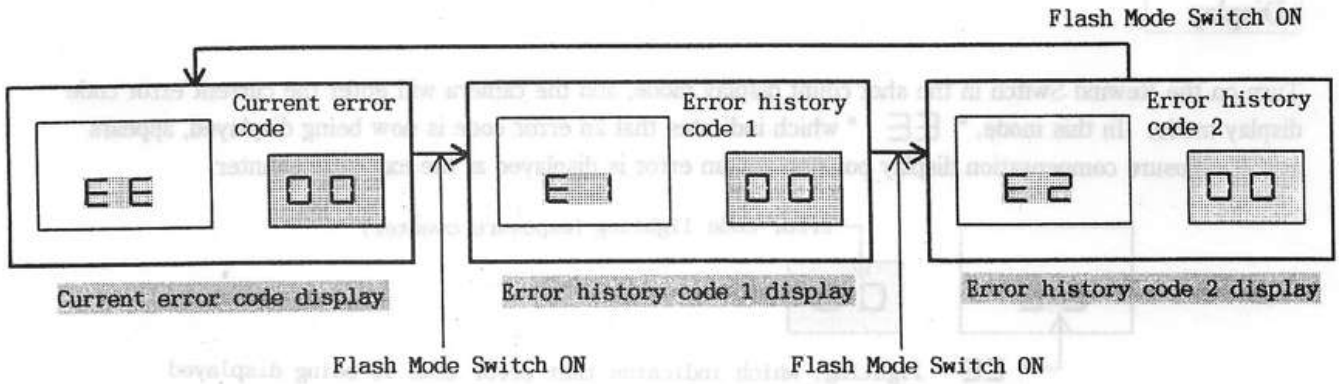
Shutter error

At the occurrence of a shutter error, this camera inhibits all the operations except mid - roll rewinding. In such a case, turn off the Main Switch to restore the camera to the normal state by the error recovery procedure. If the normal state can not be recovered or the shutter error occurs three times successively, the camera inhibits any subsequent operation. (Even the error recovery procedure by the Main Switch ON → OFF is not performed.) The camera is released from this state by unloading and loading the battery and starts the recovery operation.

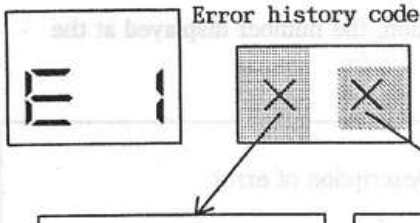
When the current error code is " 06 ", check the error history code. If the error history code is repre - senting the shutter error, consult the "Description of Error History Code".
If the error history code is not representing the shutter error, discontinue the manual adjusting mode by closing the Back Cover and turn off the Main Switch by turning the Zoom Ring to recover the camera from the error state.

Description of Error History Code

Turn on the Flash Mode Switch in the current error code display mode, and the camera will enter the error history code display mode. At this point, " E 1 " appears at the exposure compensation display position. Then turn on the Flash Mode Switch again, and the display will change to " E2 ". At these displays, the exposure counter displays the error coded 1 and 2, respectively.



The error history codes 1 and 2 indicate the kinds of trouble represented by bits.



Hexa-decimal	superior order Binary number b7 b6 b5 b4	inferior order Binary number b3 b2 b1 b0
1	0 0 0 1	0 0 0 1
2	0 0 1 0	0 0 1 0
3	0 0 1 1	0 0 1 1
4	0 1 0 0	0 1 0 0
5	0 1 0 1	0 1 0 1
6	0 1 1 0	0 1 1 0
7	0 1 1 1	0 1 1 1
8	1 0 0 0	1 0 0 0
9	1 0 0 1	1 0 0 1
A	1 0 1 0	1 0 1 0
B	1 0 1 1	1 0 1 1
C	1 1 0 0	1 1 0 0
D	1 1 0 1	1 1 0 1
E	1 1 1 0	1 1 1 0
F	1 1 1 1	1 1 1 1

The error history codes are represented by hexadecimal numbers, but the kinds of trouble are represented by binary numbers.
Example 1 :
When error history code 1 = 3B

Chenge the error history code, which is a hexadecimal number, to a binary number.

According to the hexadecimal to binary conversion table at left, the superior - order digit 3 and the inferior - order digit B of 3B are converted to binary numbers as follows:

(3) (B) Hexadecimal
↓ ↓
(0011) (1011) Binary

The binary numbers show that each bit of "1" is in trouble.
In this example, the code indicates that there were five troubles of b0, b1, b3, b4 and b5.

(0 0 1 1) (1 0 1 1)
b7 b6 b5 b4 b3 b2 b1 b0

	Superior - order of binary number				Inferior - order of binary number			
	b7	b6	b5	b4	b3	b2	b1	b0
Error history code 1 E1	Trouble 8	Trouble 7	Trouble 6	Trouble 5	Trouble 4	Trouble 3	Trouble 2	Trouble 1
Error history code 2 E2	-	-	-	Trouble13	Trouble12	Trouble11	Trouble10	Trouble 9

Each bit in "1" represents a history of the occurrence of a trouble corresponding to the trouble number.

Troubles indicated by error history codes 1 and 2

Trouble No.	Trouble	Possible Causes
1	Shutter photo - coupler signal abnormal (Normal state can not be recoverd by error procedure) *1	Broken Shutter FPC, faulty FPC connector, drive IC soldering or Auxiliary Board soldering, dust in Lens Helicoid
2	AF - IC communication error	Broken AF - FPC, defective FPC connector or AF - IC
3	Vcc voltage boosting error ("H" of VDCHK can never be detected within 200 msec.)	Faulty operation of CPU (power system, oscillator) Defective voltage booster IC, broken wire in power supply system
4	Vdd voltage boosting error ("H" of VDCHK can not be detected for 10 msec continuously.)	Some circuit which is supplied with power from Vdd is faulty.
5	"L" of VDCHK detected during operation	Defective voltage booster IC
6	Flash charge time over (equivalent to B1)	Defective inside of Flash, broken Flash FPC, faulty soldering (Not trouble if battery is new.)
7	Flash change time over (equivalent to B2)	Same as trouble No.6
8	Battery check (B1 level by open check)	Not trouble
9	Battery check (B2 level by open check)	
10	Battery check (B1 level by shutter load check)	
11	Battery check (B2 level by shutter load check)	
12	EEPROM overflow (back - up data area address overflow)	Defective EEPROM (written to full capacity) Faulty soldering of EEPROM
13	EEPROM connect error (Port SIN "L" at communication start)	Broken AF - FPC, defective FPC connector or AF - IC

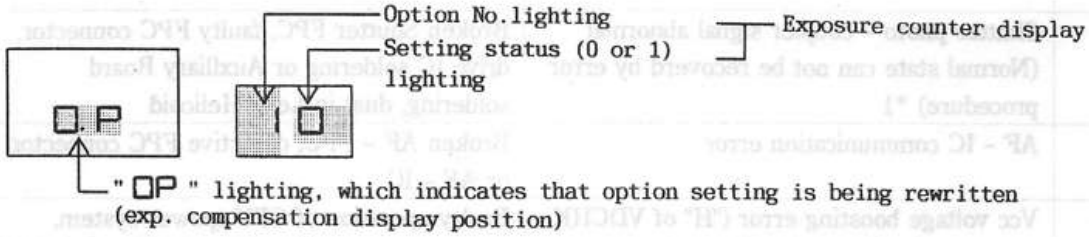
Option Setting Rewrite Mode

Purpose

Option setting can be displayed and rewritten.

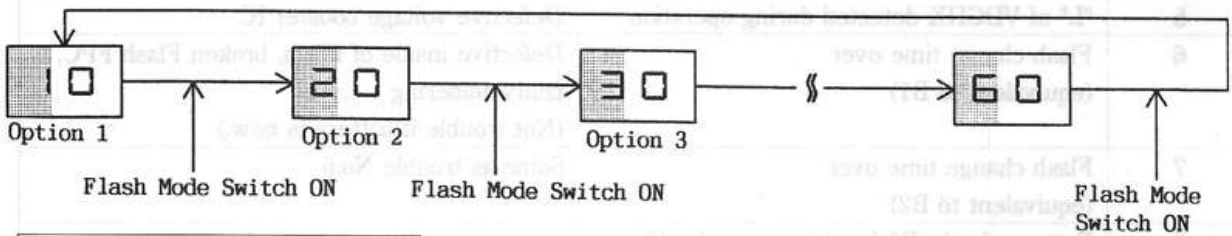
Setting Status Display

Turn on the Rewind Switch in the error code display mode, and the camera will enter this mode. At this point, " OP " which indicates that option setting is now being rewritten, appears at the exposure compensation display position. And an option No. lights up at the superior - order position of the exposure counter and the setting status lights up at the inferior - order position.


Option No.lighting
Setting status (0 or 1) lighting
Exposure counter display
" OP " lighting, which indicates that option setting is being rewritten
(exp. compensation display position)

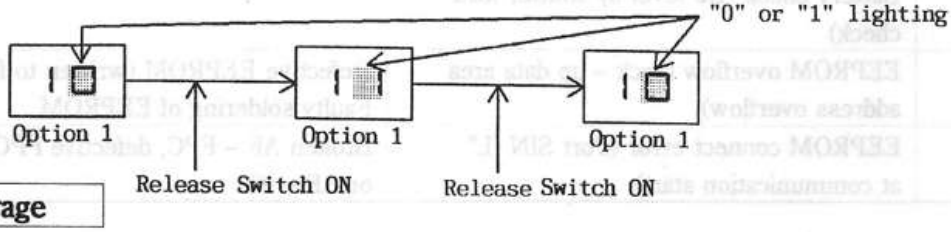
Change of Option No.

To change the option No., increment the superior - order digit at the exposure counter one by one by turning on the Flash Mode Switch.
After option No.6, option No.1 comes again.



Change of Option Setting

For the change of option setting, switching between "0" and "1" can be made at each turning on of the Release Switch.



Setting Storage

The setting is stored in memory by closing the Back Cover at completion of adjustments. (Storage is not made if the battery is taken out during adjustments.)

Option Setting List

Option No. (displayed at superior – order position of exposure counter	Contents of option	Setting (displayed at inferior – order position of exposure counter)	
		0	1
1	Selection of film tip position, when rewinding is completed.	Film rewound completely into cartridge	Film leader remains outside cartridge
2	Selection of automatic rewind (auto return)	Automatic rewind	Not automatic rewind
3	Selection of flash mode	"NORMAL"	No auto flash
4	Selection of shutter lock in AF mode	Shutter lock	Shutter – priority
5	Exposure control at fill – in flash in P mode	Slow synch	BBC (1 / 60)
6	Exposure control at fill – in flash in 3.5 ~ 16	Slow synch	BBC (1 / 60)

Initial setting (at shipment)

The option No. 3 "Selection of flash mode" is to be fixed to "NORMAL".
Do not perform the no auto flash seeting.

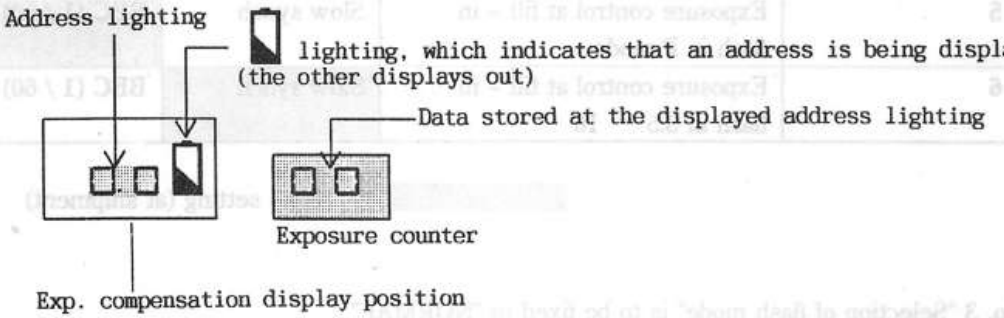
Adjusted Value Correction Mode

Purpose

Any EEPROM data can be displayed and changed.

Display

Turn on the Rewind Switch in the option setting rewrite mode, and the camera will enter this mode. At this point, an address stored in EEPROM is displayed at the exposure compensation display position and the data is displayed at the exposure counter.


Address lighting
lighting, which indicates that an address is being displayed
(the other displays out)
Data stored at the displayed address lighting
Exposure counter
Exp. compensation display position

Change of Address

To change the address, turn on the Check Switch or Flash Mode Switch with the Self - timer Switch in the OFF position.
The address can be changed in a range of $00 to $5F. After $5F, $00 comes again.

a) Address increment
The address is automatically incremented while the Check Switch is turned on with the Self - timer Switch in the OFF position.
The address is incremented by +1 when the Check Switch is turned on for less than 1 sec. When the Check Switch is turned on for more than 1 sec., the address is incremented at 16 Hz one by one from the inferior - order display position

b) Address decrement
The address is automatically decremented while the Flash Mode Switch is turned on with the Self - timer Switch in the OFF position. Preform decrement in the same way as increment.

Change of Data

To change the data, turn on the Check Switch or Flash Mode Switch with the Self - timer Switch in the ON position.
The data can be changed at addresses of $08 to $5F. The data at the addresses currently used for back - up data can not be changed. (There is no need of change.)
Each data can be changed in a range of $00 to $FF. After $FF, $00 comes again.

a) Data increment

Data is automatically decremented while the Check Switch is turned on with the Self - timer Switch in the ON position.

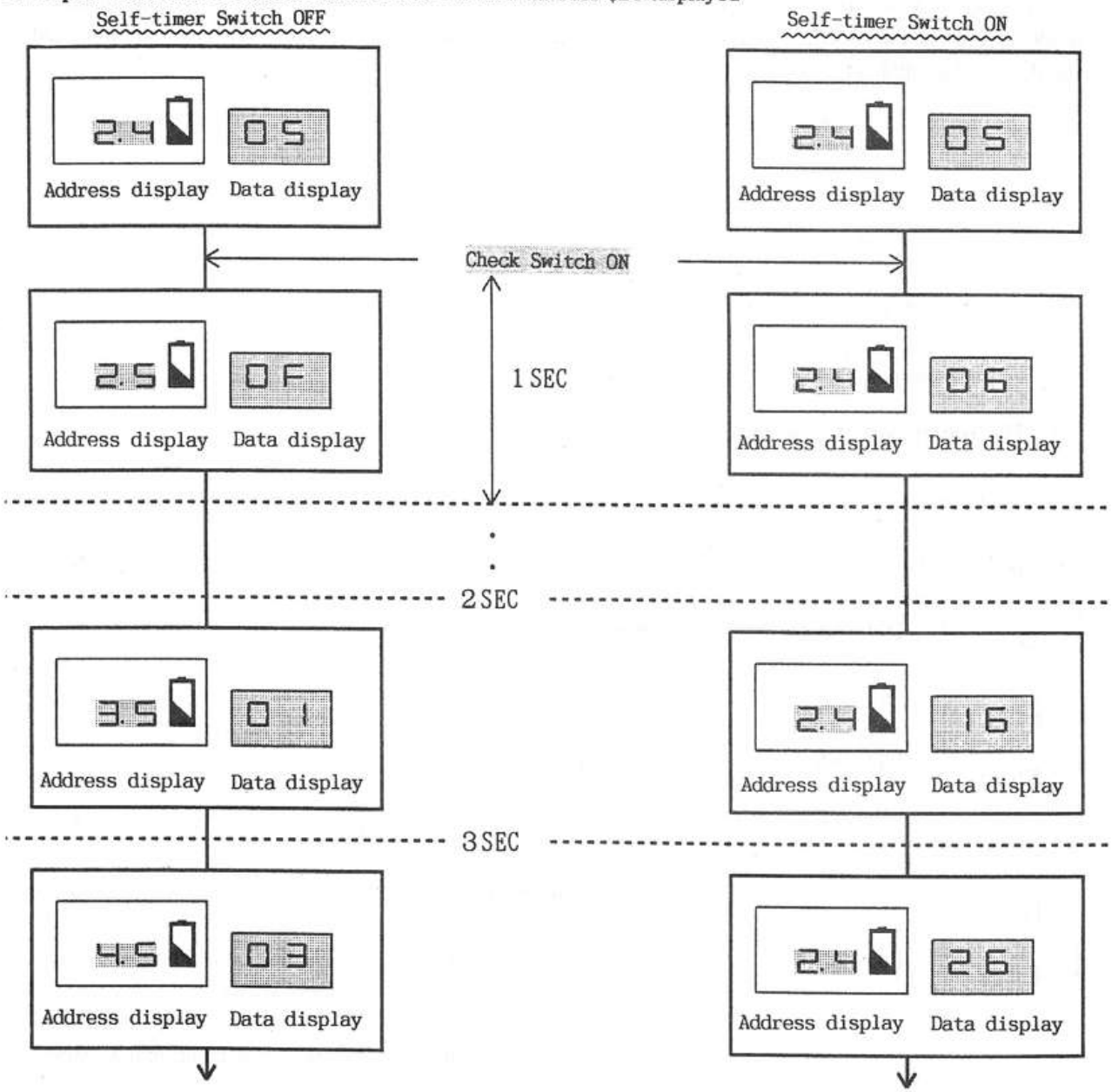
Perform data increment in the same way as address increment.

b) Data decrement

Data is automatically decremented while the Flash Mode Switch is turned on with the Self - timer Switch in the ON position.

Perform data decrement in the same way as address increment.

Example: When the Check Switch is turned on with address $24 displayed



When the Rewind Switch is turned on during data increment or data decrement, all the external LCD displays light up during the turning on of the Rewind Switch and all the data are reset (initial values are set). The adjusted values are written only at completion of manual adjustments.

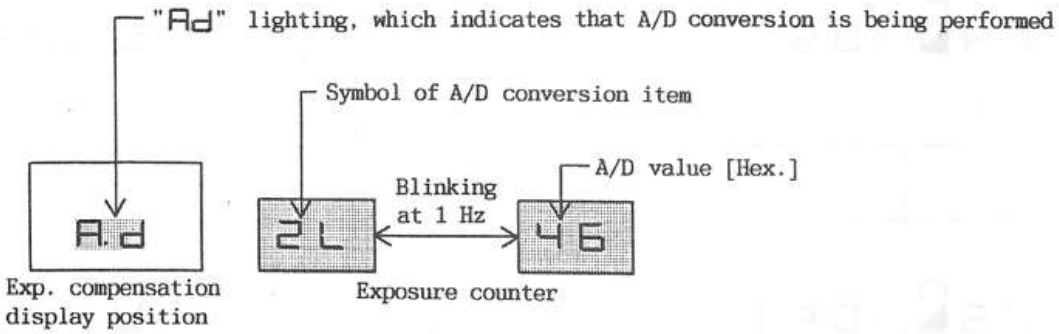
A / D Value Display Mode

Purpose

The A / D conversion result at A / D conversion port of the CPU can be displayed.

Display

Turn on the Rewind Switch in the adjusted value correction mode, and the camera will enter the A / D value display mode. At this point, " Ad " which indicates that the camera is now in the A / D value display mode, appears at the exposure compensation display position and the symbol of A / D conversion item and the A / D value blink alternately at the exposure counter.



A / D Conversion Items

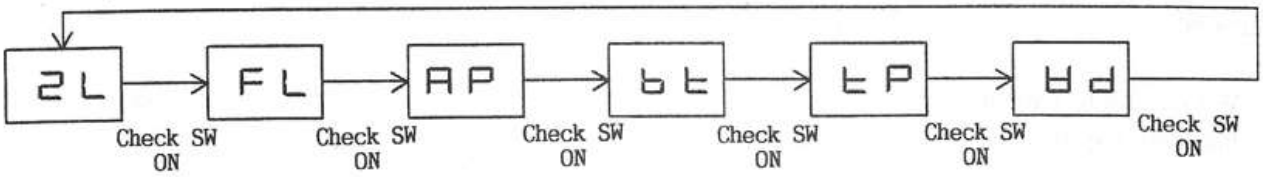
The A / D conversion items and their symbols are as follows:

Symbol	A / D conversion port	A / D conversion item	Remarks
2L	P60 / AN 0	Zoom Ring A / D value	Adjusted value of Vref is not taken into account.
FL	P61 / AN 1	Focus Dial A / D value	
AP	P62 / AN 2	Aperture Ring A / D value	
bt	P65 / AN 5	Battery check A / D value	Without load and with load *
tP	P67 / AN 7	Temperature data A / D value	Adjusted valure of temperature is taken into account *
Ud	P63 / AN 4	Winding Photo − coupler A / D value	Turning on of Photo LED (port WPC) *

* Adjusted value of Vref is taken into account.

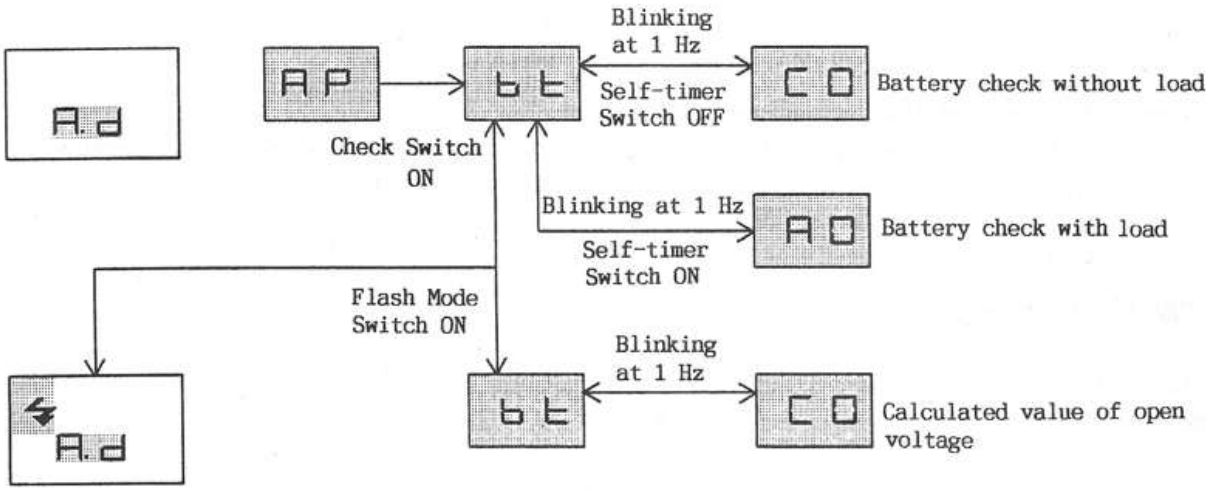
Change of A / D Coversion Item

The A / D conversion item can be changed in the following rotation by turning on the Check Switch:



" bt " : Battery check A / D value display

Only in the case of battery check A / D value display, three kinds of A / D values can be displayed.
On the battery check A / D value display, the A / D value of the battery check result without load is displayed by turning off the Self - timer Switch and that with load is displayed by turning on the Self - timer Switch.
Irrespective of the Self - timer Switch position, at the turning on of the Flash Mode Switch, the display indicates an open voltage value calculated from the battery check value with load and that without load.
During this display, " ↯ " is displayed to indicate that an open voltage is being displayed.



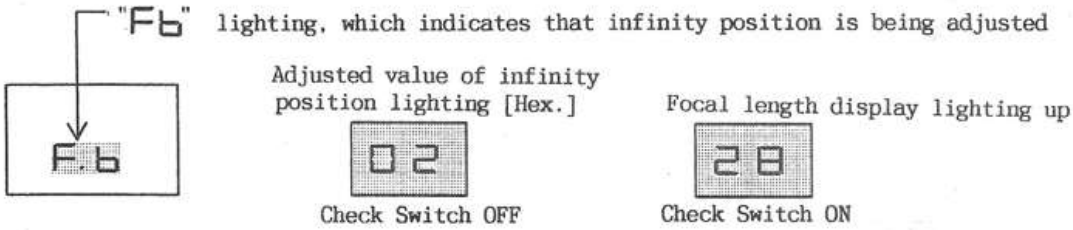
Infinity Position (FB) Adjusting Mode

Purpose

The AF Lens can be extended by a preset number of AF Lens extend pulses and the shutter can be kept open fully with the AF Lens in the advanced position.

Display

Turn on the Rewind Switch in the A / D value display mode, and the camera will enter the infinity position adjusting mode. At this point, " Fb " which indicates that the camera is now in the infinity position adjusting mode, appears at the exposre compensation display position. And the exposure counter displays the adjusted value of the infinity position at the turning off of the Check Switch and the focal length at the turning on of the Check Switch.


"Fb" lighting, which indicates that infinity position is being adjusted
Adjusted value of infinity position lighting [Hex.]
Focal length display lighting up
Check Switch OFF
Check Switch ON

Notes: Only the cameras of the improved CPU version allow the focal length display at the turning on of the Check Switch. With a camera of the initial version, the exposure counter remains displaying the adjusted value of the infinity position even at the turning on of the Check Switch.

Change of Adjusted Value of Infinity Position

The adjusted value of the infinity position can be changed by changing the Self - timer Switch position and turning on the Flash Mode Switch with the Check Switch in the OFF position.

Increment of adjusted value of infinity position: The adjusted value is incremented one by one at each turning on of the Flash Mode Switch with the Self - timer Switch in the OFF position.

Decrement of adjusted value of infinity position: The adjusted value is decremented one by one at each turning on of the Flash Mode Switch with the Self - timer Switch in the ON position.

The adjusted value is written in EEPROM only at completion of manual adjustments.

Camera Operation

At the turning on of the Release Switch, the AF Lens is extended according to the preset adjusted value of the infinity position (AF setting and reset drive). And the shutter is kept open during the turning on of the Release Switch. At the turning off of the Release Switch, the shutter is closed and the AF Lens is reset.

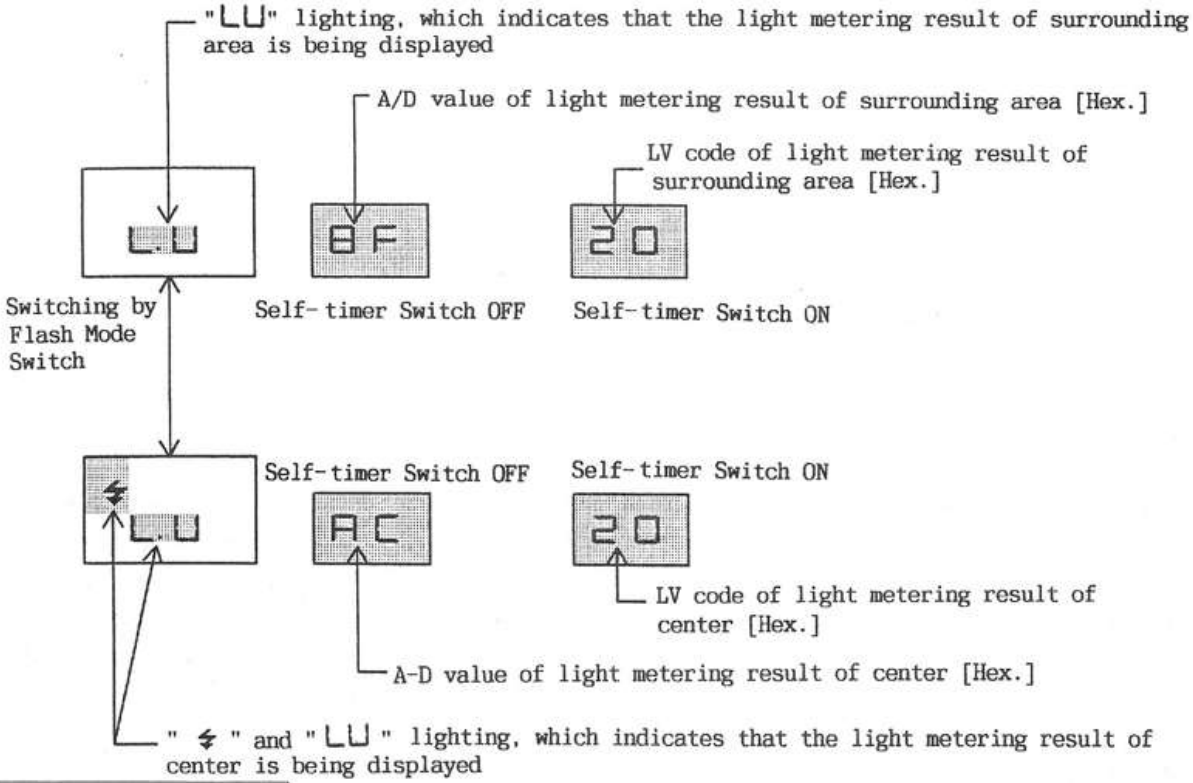
Light Metering Value Display Mode

Purpose

The A / D value of a light metering result and the LV code can be displayed at the exposure counter.

Display

Turn on the Rewind Switch in the infinity position adjusting mode, and the camera will enter the light metering value display mode. At this point, " LU " which indicates that the camera is now in the light metering adjusting mode, appears at the exposure compensation display position. And the exposure counter displays the adjusted value of the light metering result at the turning off of the Self - timer Switch and the corresponding LV code at the turning on of the Self - timer Switch.


"LU" lighting, which indicates that the light metering result of surrounding area is being displayed
A/D value of light metering result of surrounding area [Hex.]
LV code of light metering result of surrounding area [Hex.]
LU
8F
20
Switching by Flash Mode Switch
Self-timer Switch OFF
Self-timer Switch ON
Self-timer Switch OFF
Self-timer Switch ON
LU
AC
20
LV code of light metering result of center [Hex.]
A-D value of light metering result of center [Hex.]
" ⚡ " and "LU" lighting, which indicates that the light metering result of center is being displayed

Camera Operation

The light metering result display can be switched between the A / D value and the LV code by changing the Self - timer Switch position.

Self - timer Switch OFF : A / D value display
Self - timer Switch ON : LV code display

Switching between the light metering of surrounding area and the light metering of center can be made at each turning on of the Flash Mode Switch. At the light metering result display of center, the pre - flash mark " ⚡ " lights up at the flash mode display position.
Temperature compensation is taken into account at each of the light metering of surrounding area and that of center.

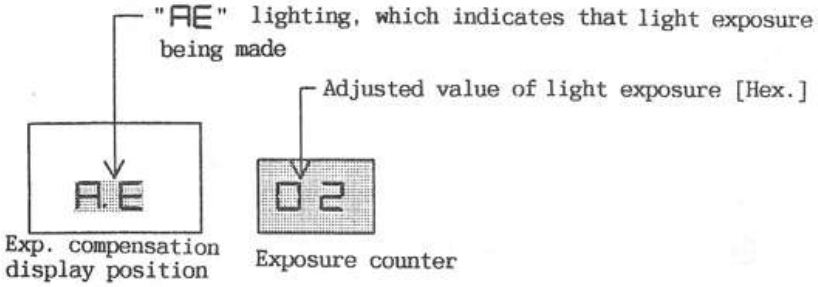
Light Exposure Adjusting Mode

Purpose

Light metering can be performed according to the preset adjusted value of light exposure and the shutter can be operated accordingly.

Display

Turn on the Rewind Switch in the light metering value display mode, and the camera will enter the light exposure adjusting mode. At this point, " AE " which indicates that the camera is now in the exposure adjusting mode, appears at the exposure compensation display position. And the exposure counter displays the adjusted value of exposure.


"AE" lighting, which indicates that light exposure adjustment is being made
Adjusted value of light exposure [Hex.]
AE
02
Exp. compensation display position
Exposure counter

Change of Adjusted Value of Light Exposure

The adjusted value of light exposure can be changed by changing the Self - timer Switch position and turning on the Flash Mode Switch.
The adjusted value is written in EEPROM only at completion of manual adjustments.
Increment of adjusted value of light exposure: The adjusted value is incremented one by one at each turning on of the Flash Mode Switch with the Self - timer Switch in the OFF position.
Decrement of adjusted value of light exposure: The adjusted value is decremented one by one at each turning on of the Flash Mode Switch with the Self - timer Switch in the ON position.

Camera Operation

At the turning on of the Release Switch, the shutter is operated according to the light metering result.
In this operation, the preset adjusted value is used. Other conditions are as follows:

ISO value:	Value read from DX code
A / D adjusted value of light metering:	Value written in EEPROM
Adjusted value of aperture size:	Value written in EEPROM
Adjusted value of shutter delay:	Value written in EEPROM
Flash mode:	Flash - off mode
Zoom and aperture setting:	Value read and set at each time
Exposure compensation:	Ignored (regarded as no compensation)
AF Lens position:	Infinity position

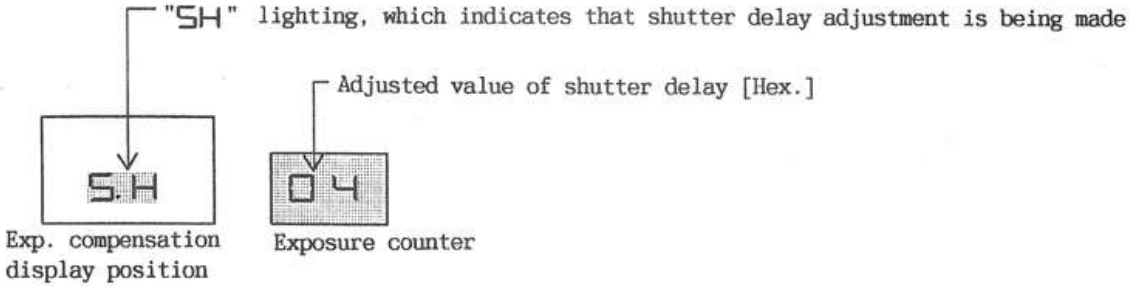
Shutter Delay Adjusting Mode

Purpose

Light metering can be performed according to the preset adjusted value of shutter delay and the shutter can be operated accordingly.

Display

Turn on the Rewind Switch in the light exposure adjusting mode, and the camera will enter the shutter delay adjusting mode. At this point, " SH " which indicates that the camera is now in the shutter delay adjusting mode, appears at the exposure compensation display position. And the exposure counter displays the adjusted value of shutter delay.


"SH" lighting, which indicates that shutter delay adjustment is being made
Adjusted value of shutter delay [Hex.]
SH
04
Exp. compensation display position
Exposure counter

Change of Adjusted Value of Shutter Delay

The adjusted value of shutter delay can be changed by changing the Self - timer Switch position and turning on the Flash Mode Switch.
The adjusted value is written in EEPROM only at completion of manual adjustments.
Increment of adjusted value of shutter delay: The adjusted value is incremented one by one at each turning on of the Flash Mode Switch with the Self - timer Switch in the OFF position.
Decrement of adjusted value of shutter delay: The adjusted value is decremented one by one at each turning on of the Flash Mode Switch with the Self - timer Switch in the ON position.

Camera Operation

At the turning on of the Release Switch, the shutter is operated according to the light metering result.
In this operation, the preset adjusted value of shutter delay is used. Other conditions are as follows:

ISO value:	Value read from DX code
A / D adjusted value of light metering:	Value written in EEPROM
Adjusted value of aperture size:	Value written in EEPROM
Adjusted value of light exposure:	Value written in EEPROM
Flash mode:	Flash - off mode
Zoom and aperture setting:	Value read and set at each time
Exposure compensation:	Ignored (regarded as no compensation)
AF Lens position:	Infinity position

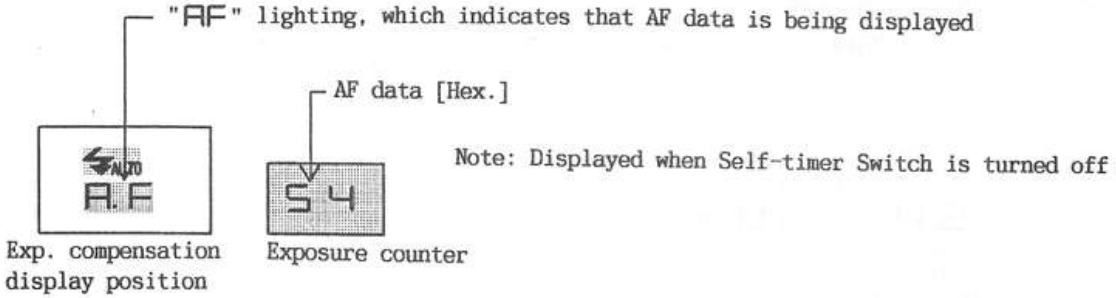
AF Data Display Mode

Purpose

The distance metering data can be obtained.

Display

Turn on the Rewind Switch in the shutter delay adjusting mode, and the camera will enter the AF data display mode. At this point, " AF " which indicates that the camera is now in the AF data display mode, appears at the exposure compensation display position. And the exposure counter displays the result of each light metering conducted at each second.


"AF" lighting, which indicates that AF data is being displayed
AF data [Hex.]
Note: Displayed when Self-timer Switch is turned off
Exp. compensation display position
Exposure counter

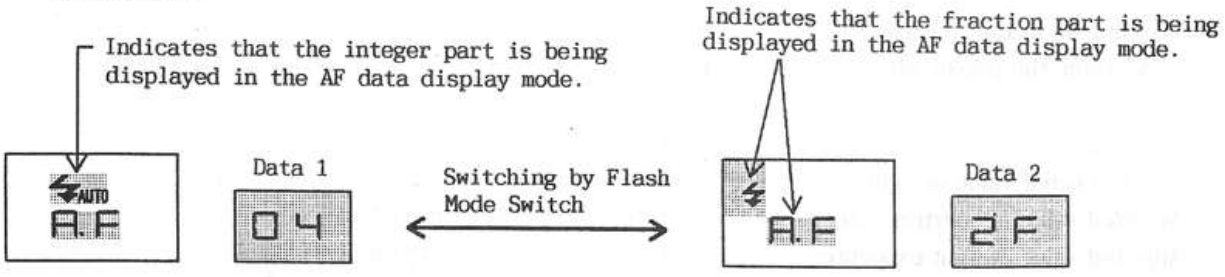
Self - timer Switch OFF : Data received from AF - IC
Self - timer Switch ON : Distance metering data with 13 bits of integer part and fraction part processed to 8 bits, and abnormality output value

AF Data

The AF data displayed varies with the Self - timer Switch position.

① When Self - timer Switch is OFF

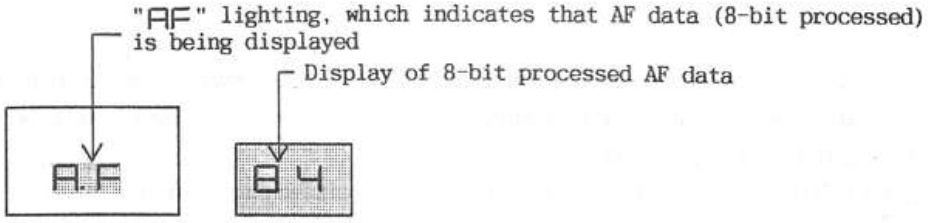
- The 2 - byte data (integer part and fraction part) received from the AF - IC is displayed without any change.
- This data, used for data analysis, is not used at adjustments generally.
- The display is switched between the integer part and the fraction part at each turning on of the Flash Mode Switch.


Indicates that the integer part is being displayed in the AF data display mode.
Indicates that the fraction part is being displayed in the AF data display mode.
Data 1
Switching by Flash Mode Switch
Data 2

- Data 1 (data of integer part) is displayed in a from where D16, D18 and D19, which represent default data, are placed at the three superior - order bits. (D17 is a bit representing DEF3, which is normal.)
- In this case, the data received from the AF - IC is displayed without temperature compensation.

② When Self – timer Switch is ON (8 – bit processed data on distance metering)

- The distance metering data is displayed in 8 bits as the distance metering operation in the camera sequence is carried out in 8 bits.
- The AF adjustment is made using this data.
- When distance metering result is a default data (distance metering is impossible) or when D3 bit is "1" (close distance), " □□ " is displayed.



- This 8 – bit processed data has been corrected by temperature compensation.

AF – assist Beam Emission Control

Whether or not to emit the AF – assist beam can be selected by setting the Aperture Ring. (Irrespective of the setting of the Self – timer Switch)

Aperture Ring setting	"P" ～ "F5.6"	: No emission of AF – assist beam
	"F5.6" ～ "F16"	: Emission of AF – assist beam

Selection of Sensor Sensitivity

The high or low sensor sensitivity can be selected when the Focus Dial has been set in the manual focusing range.

Focus Dial setting	Infinity ～ 1m	: Low sensitivity (Port SEL = "H")
	1m ～ 0.5m	: High sensitivity (Port SEL = "L")

Auto Selection of AF – assist Beam Emission and Sensor Sensitivity

When the Focus Dial has been set in the "AF" position, the selections of AF – assist beam emission and sensor sensitivity are carried out the same way as in the AF mode where the focus is adjusted in the normal camera sequence.

- The selection of sensor sensitivity is performed at port SEL according to the LV code which is determined from the result of the light metering being carried out. This selection is performed at each distance metering.

LV code < $58 (brighter than LV8)	: Low sensitivity (Port SEL = "H")
LV code ≧ $58 (dimmer than LV8)	: High sensitivity (Port SEL = "L")

- The AF – assist beam emission is selected in the following two cases:
  a) The AF – assist beam is emitted when the LV code determined from light metering is $78 or above (dimmer than LV4).

b) Distance metering is performed without the emission of the AF - assist beam when the LV code is below $78 (brighter than LV4) as a result of a) above. However, if the result of the distance metering is DEF1, 2 or 4 of default data, the AF - assist beam is emitted and distance metering is performed again.

Lens Drive

During the 8 - bit data display which is set by turning on the Self - timer Switch, the AF Lens can be driven according to the result of distance metering by turning on the Check Switch. (Same way as when the Check Switch is turned on in the camera sequence)
In this operation, EEPROM data is used as the adjusted value of the infinity position.
While the Check Switch is turned on, the exposure counter displays the number of Lens driving pulses (1 - 30) in decimal notation.
The opening and closing of the shutter is not performed.

C-1-2. Manual Adjustment Procedure

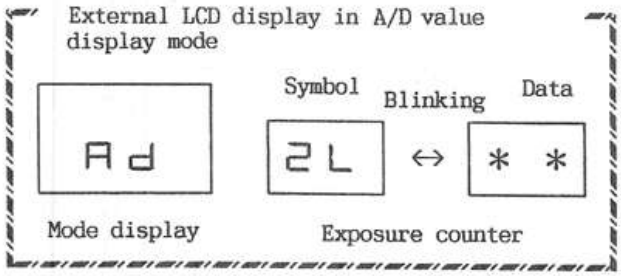
Dial A / D Adjustments

Purpose

The resistance values of the Zoom Ring, Aperture Ring and Focus Dial are adjusted electrically.
These adjustments are to be made when the dial settings can not be read normally.
Once the Front Cover is removed, make A / D adjustments of the Zoom Ring and Aperture Ring.

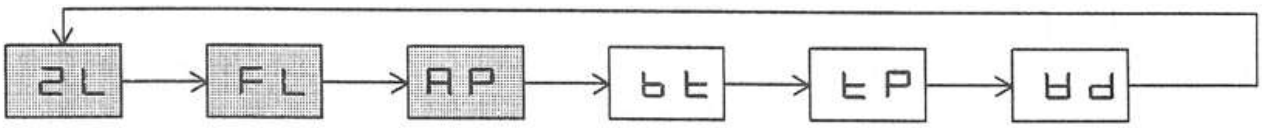
Adjustment Procédure

① Set the camera in the first manual adjusting mode and then set it in the A / D value display mode by pressing the Rewind Switch four times. At the setting of this mode, " Ad " appears at the exposure compensation display position.
In the A / D value display mode, the symbol of A / D conversion being performed and the A / D value blink alternately at the exposure counter.



Kinds of dial adjustments	Symbol
Zoom Ring A/D adjustment	2L
Focus Dial A/D adjustment	FL
Aperture Ring A/D adjustment	AP

② After the setting of the A / D value display mode, select the symbol of the dial adjustment to be made by pressing the Shutter Release Button halfway down (Check Switch ON), while consulting the exposure counter display.



③ When the symbol of the adjustment to be made has been displayed, read the A / D value at each adjustment point of the dial.

Adjustment points of dials		Basic design A / D value	Range of adjusted values
Zoom Ring *WIDE end is the click stop point when moved from TELE side	WIDE end (click stop point)	5D	FB ~ 10
	TELE end	EB	E8 ~ 10
Focus Dial * ∞ position is the click stop point when moved from 0.5m side	"AF" position	11	F0 ~ 14
	" ∞ " position (click stop position)	2F	F0 ~ 14
	"0.5m" position	E4	F0 ~ 14
Aperture Ring	"P" position	20	F0 ~ 18
	"16" position	E0	E8 ~ 18

④ When A / D values at the adjustment points have been obtained, select adjusted values from the following table.

A/D Value Reading→Adjusted Value List							
Adjusted value	Zoom Ring reading		Focus Dial reading			Aperture Ring reading	
	WIDE end	TELE end	AF	∞	0.5	P	16
E8		D3					C8
E9		D4					C9
EA		D5					CA
EB		D6					CB
EC		D7					CC
ED		D8					CD
EE		D9					CE
EF		DA					CF
F0		DB	01	1F	D4	10	D0
F1		DC	02	20	D5	11	D1
F2		DD	03	21	D6	12	D2
F3		DE	04	22	D7	13	D3
F4		DF	05	23	D8	14	D4
F5		E0	06	24	D9	15	D5
F6		E1	07	25	DA	16	D6
F7		E2	08	26	DB	17	D7
F8		E3	09	27	DC	18	D8
F9		E4	0A	28	DD	19	D9
FA		E5	0B	29	DE	1A	DA
FB	58	E6	0C	2A	DF	1B	DB
FC	59	E7	0D	2B	E0	1C	DC
FD	5A	E8	0E	2C	E1	1D	DD
FE	5B	E9	0F	2D	E2	1E	DE
FF	5C	EA	10	2E	E3	1F	DF
00	5D	EB	11	2F	E4	20	E0
01	5E	EC	12	30	E5	21	E1
02	5F	ED	13	31	E6	22	E2
03	60	EE	14	32	E7	23	E3
04	61	EF	15	33	E8	24	E4
05	62	F0	16	34	E9	25	E5
06	63	F1	17	35	EA	26	E6
07	64	F2	18	36	EB	27	E7
08	65	F3	19	37	EC	28	E8
09	66	F4	1A	38	ED	29	E9
0A	67	F5	1B	39	EE	2A	EA
0B	68	F6	1C	3A	EF	2B	EB
0C	69	F7	1D	3B	F0	2C	EC
0D	6A	F8	1E	3C	F1	2D	ED
0E	6B	F9	1F	3D	F2	2E	EE
0F	6C	FA	20	3E	F3	2F	EF
10	6D	FB	21	3F	F4	30	F0
11			22	40	F5	31	F1
12			23	41	F6	32	F2
13			24	42	F7	33	F3
14			25	43	F8	34	F4
15						35	F5
16						36	F6
17						37	F7
18						38	F8

⑤ When the A / D value reading is not found in the table, the A / D value is out of adjustment range (assembly is faulty). In such a case, check the assembly and make adjustments again.

Reason for "out of adjustment range"	Possible causes		
	Zoom Ring	Focus Dial	Aperture Ring
A / D value reading fluctuat − ing	· Faulty pressed portion of FPC · Faulty soldering of FPC and pattern · Floating Zoom contact · Broken FPC pattern	· Faulty soldering of FPC in dial and pattern · Floating Focus Dial contact · Broken FPC pattern	· Faulty pressed portion of FPC · Faulty soldering of FPC and pattern · Dislocated aperture contact pattern · Broken FPC pattern
A / D value reading much smaller than basic design value	Faulty engagement of cam drive gear of Zoom and cam drive plate of View − finder		

Notes: When the A / D value at the WIDE end of the Zoom Ring is smaller than $58 (smaller than $FB in adjusted value), the Main Switch OFF display may not appear even with the Zoom Ring in the Main Switch OFF position. Take due care not to overlook such a trouble.

⑥ After the selection of the adjusted values, write them in EEPROM in the adjusted value correction mode.

		EEPROM address for writing
Zoom Ring	WIDE end (click stop point)	48
	TELE end	49
Focus Dial	"AF" position	4A
	" ∞ " position (click stop position)	4B
	"0.5m" position	4C
Aperture Ring	"P" position	4D
	"16" position	4E

Flange Back Adjustment

Purpose

- Make flange back adjustment (replace the F.B Adjustment Washers) after the replacement of the Lens Barrel Ass'y (3BKB4100).
- After the flange back adjustment, make the lens infinity position (F / B) adjustment.

Measuring Instruments

Auto collimator (24LT - 2DTS: F=193.5mm)
Standard mirror stand

Adjustment Procedure

Notes:

a) The Lens Barrel Ass'y (3BKB4100) as a service part is supplied with the Lens in the infinity position and the shutter open. Handle it carefully.

b) Remove the F.B Adjustment Washers, if they have been installed between the Aperture (3BK10210) and the Body. (See Fig. 11)

① Place the F.B Adjustment Washers (t:0.40) (60141810) × 4 between the Body and the Lens Barrel Ass'y and tighten the Lens Barrel Setscrews (69217076) × 4.
② Remove gently the Infinity Stopper (S.Guide Rubber) installed in the Shutter. (See Fig. 42)
③ Set the camera on the standard mirror stand and set them on the collimator stand.
④ Move the Zoom Pin of the Lens Barrel and set the Zoom in the TELE position. (See Fig. 43)
At this point, while holding the Zoom Ring to prevent the Zoom from moving and preventing the Body from floating above the standard mirror stand, look at the chart image of the collimator through the eyepiece.
⑤ Make sure that the focus is adjusted within a collimator graduation range of 0 ± 0.7 (equivalent to F.B ± 0.05).
⑥ If the focus is not adjusted within the range above, replace the Washers (t: 0.4mm) installed at ① with other ones so that the focus is adjusted within the standard range.
⑦ Complete the camera by installing the parts and make the lens infinity position (F / B) adjustment.
(See page C - 26)

Parts to be used: Selective washers
(F.B Adjustment Washer) × 4

60621810 (t: 0.02)
60651810 (t: 0.05)
60101810 (t: 1.0)
60111810 (t: 0.1)
60121810 (t: 0.2)
60131810 (t: 0.3)
60141810 (t: 0.4)
60151810 (t: 0.5)
60161810 (t: 0.6)
60171810 (t: 0.7)
60181810 (t: 0.8)

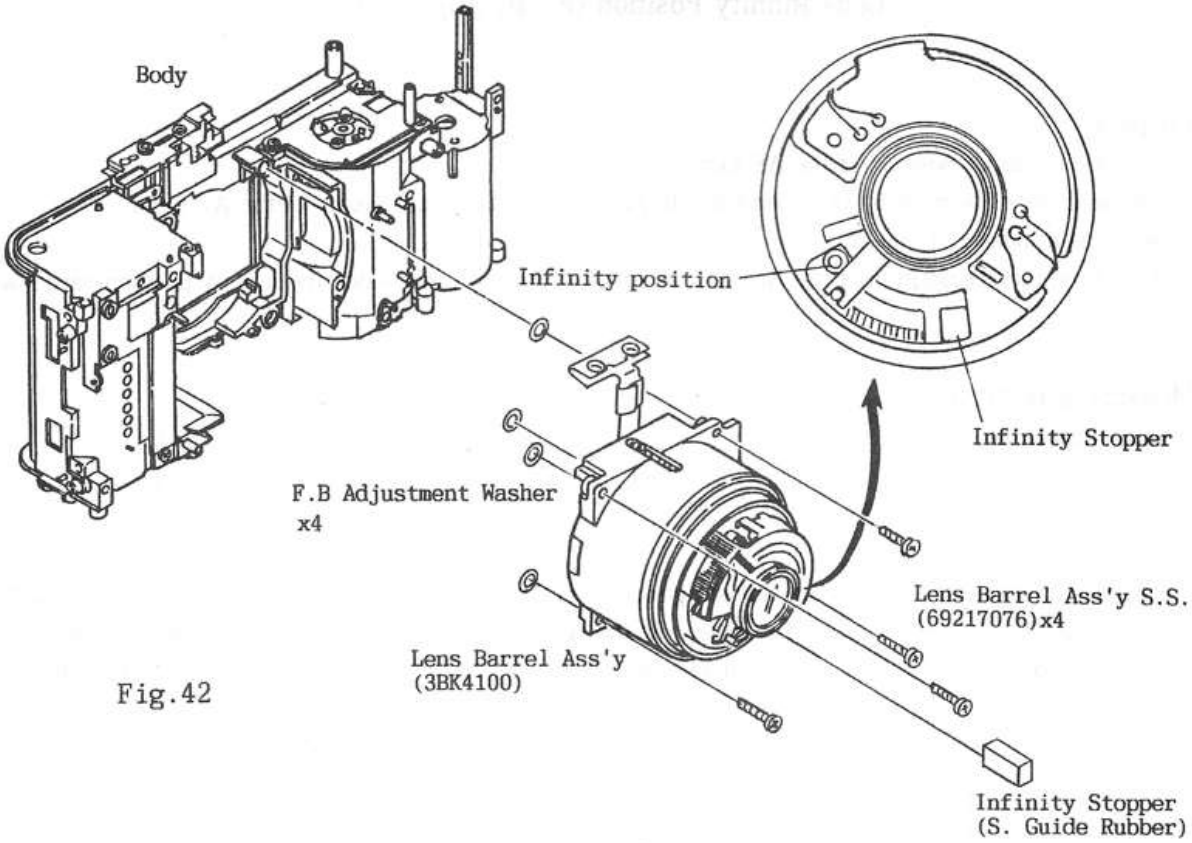

Body
Infinity position
Infinity Stopper
F.B Adjustment Washer
x4
Lens Barrel Ass'y S.S.
(69217076)x4
Lens Barrel Ass'y
(3BK4100)
Infinity Stopper
(S. Guide Rubber)

Fig.42

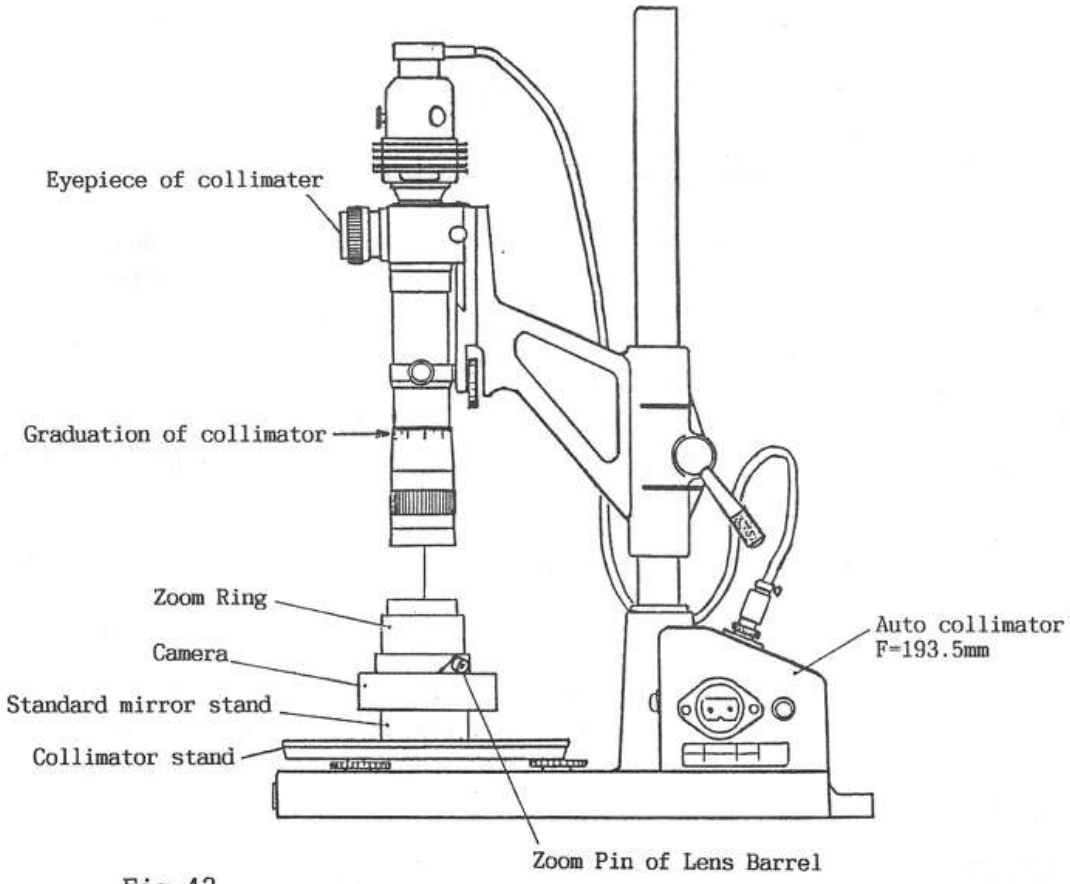

Eyepiece of collimater
Graduation of collimator
Zoom Ring
Camera
Standard mirror stand
Collimator stand
Auto collimator
F=193.5mm
Zoom Pin of Lens Barrel

Fig.43

Lens Infinity Position (F / B) Adjustment

Purpose

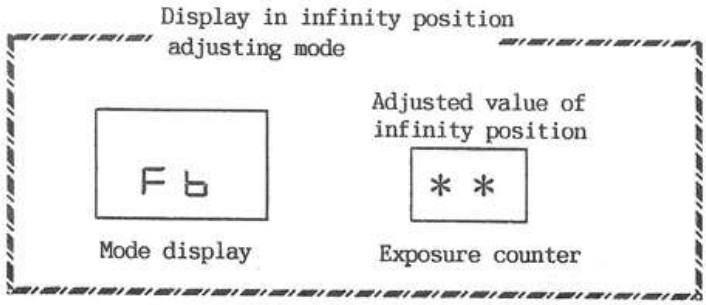
Adjust the infinity position of the AF Lens.
The adjustment is made by changing the infinity position adjustment pulses of the AF Lens.
Adjustment pulses of the AF Lens.
Adjust the infinity position of the AF Lens at seven Zoom positions, since the infinity position varies with the Zoom position.

Measuring Instruments

Auto collimator
Standard mirror stand

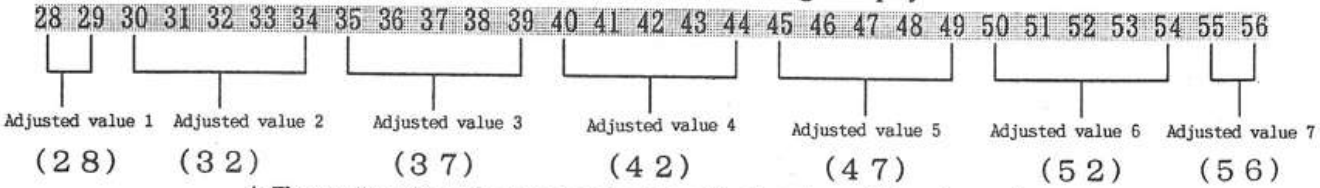
Adjustment Procedure

① Set the camera in the first manual adjusting mode and then set it in the infinity position adjusting mode by pressing the Rewind Switch five times. At the setting of this mode, " F b " appears at the exposure compensation display position and the exposure counter displays the adjusted value of the infinity position.



② During the turning on of the Release Switch in this mode, the AF Lens is advanced according to the pulse count determined by the adjusted value of the infinity position, which is displayed at the exposure counter, and the shutter is kept open. (Reset at the turning off of the Release Switch)

③ There are different adjusted values for different setting positions of the Zoom Ring. That is, there is an adjusted value for each of the following seven zones of focal length displays:


28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56
Adjusted value 1
Adjusted value 2
Adjusted value 3
Adjusted value 4
Adjusted value 5
Adjusted value 6
Adjusted value 7
(28) (32) (37) (42) (47) (52) (56)

* The number in ( ) represents the adjustment position in each zone.

In this mode, the focal length can be displayed at the exposure counter by turning on the Ckeck Switch. This display, however, is allowed only on the cameras of improved CPU version. Cameras of initial version remain displaying the adjusted value of the infinity position at the exposure counter even at the turning on of the Check Switch.

Adjusted value of infinity position

Check Switch OFF

Focal length

Check Switch ON

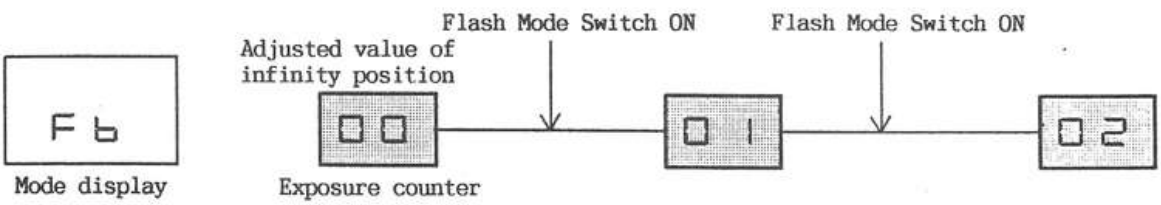
④ Set the camera on the collimator for adjustment and increase or decrease the adjusted value of the infinity position so that the focal plane dislocation △ Lmm of the infinity position at each focal length is within the allowable range. (See "Table of Focal Plane Dislocation △ Lmm from Film Surface")

	Adjustment focal length (display)	Adjustment focal length (actual)	Focal plane shift per pulse	Allowable width (△ Lmm) Focal plane dislocation
Adjusted value of infinity position 1	28mm	29.29mm	0.060mm	±0.060mm
2	32	34.01	0.081	±0.081
3	37	38.11	0.102	±0.102
4	42	42.23	0.126	±0.126
5	47	46.48	0.152	±0.152
6	52	50.20	0.177	±0.177
7	56	53.38	0.201	±0.201

⑤ The increase and decrease of the adjusted value of the infinity position can be performed by means of the Flash Mode Switch combined with the Self - timer Switch position.

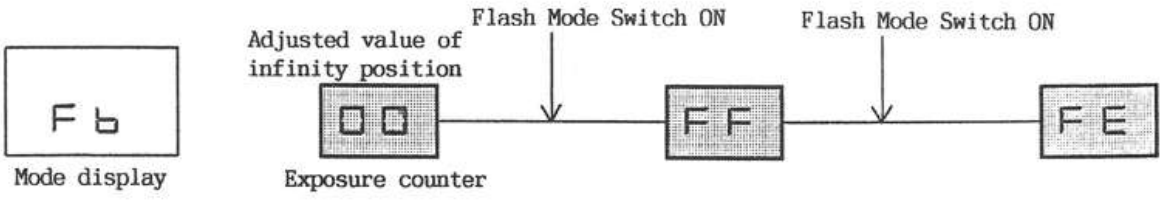
Increment of adjusted value of infinity position : The adjusted value is incremented one by one at each turning on of the Flash Mode Switch with the Self - timer Switch in the OFF position.

《 Self - timer Switch OFF 》



Decrement of adjusted value of infinity position : The adjusted value is decremented one by one at each turning on of the Flash Mode Switch with the Self - timer Switch in the ON position.

《 Self - timer Switch ON 》



⑥ When the adjusted value of the infinity position is "00", the number of AF Lens drive pulses is 3, which is the basic value.
The adjusted value width at the adjusted values 1 and 2 (focal length display of 28 ~ 34) is FD ~ 04.
The adjusted value width at the adjusted values 3 ~ 7 (focal length display of 35 ~ 56) is FD ~ 03.

	Adjusted value width at the adjusted values 1 and 2 (focal length display of 28~34)		Adjusted value width at the adjusted values 3~7 (focal length display of 35~56)					
Adjusted of infinity position	FD	FE	FF	00	01	02	03	04
Camera control infinity position	00	01	02	03	04	05	06	07

⑦ If the camera does not become allowable within the adjusted value width by increase or decrease of the adjusted value, remove the Aperture and make adjustment by placing (or removing) washers between the Aperture and the Body.
This adjustment with washers must be 0.2mm or less.

Table of Focal Plane Dislocation △ Lmm from Film Surface

Collimator F 193.5

Collimator travel D (read)	1 (28)	2 (32)	3 (37)	4 (42)	5 (47)	6 (52)	7 (56)
	29.29	34.01	38.11	42.23	46.48	50.2	53.38
	△L mm	△L mm	△L mm	△L mm	△L mm	△L mm	△L mm
0.1	0.002	0.003	0.004	0.005	0.006	0.007	0.008
0.2	0.005	0.006	0.008	0.010	0.012	0.013	0.015
0.3	0.007	0.009	0.012	0.014	0.017	0.020	0.023
0.4	0.009	0.012	0.016	0.019	0.023	0.027	0.031
0.5	0.011	0.015	0.019	0.024	0.029	0.034	0.038
0.6	0.014	0.019	0.023	0.029	0.035	0.041	0.046
0.7	0.016	0.022	0.027	0.033	0.041	0.047	0.053
0.8	0.018	0.025	0.031	0.038	0.046	0.054	0.061
0.9	0.021	0.028	0.035	0.043	0.052	0.061	0.069
1.0	0.023	0.031	0.039	0.048	0.058	0.068	0.076
1.2	0.028	0.037	0.047	0.058	0.070	0.081	0.092
1.4	0.032	0.044	0.055	0.067	0.081	0.095	0.107
1.6	0.037	0.050	0.063	0.077	0.093	0.109	0.123
1.8	0.042	0.056	0.070	0.087	0.105	0.122	0.138
2.0	0.046	0.062	0.078	0.096	0.117	0.136	0.154
2.2	0.051	0.069	0.086	0.106	0.128	0.150	0.169
2.4	0.056	0.075	0.094	0.116	0.140	0.164	0.185
2.6	0.060	0.081	0.102	0.126	0.152	0.177	0.201
2.8	0.065	0.088	0.110	0.135	0.164	0.191	0.216
3.0	0.070	0.094	0.118	0.145	0.176	0.205	0.232
3.2	0.075	0.101	0.126	0.155	0.188	0.219	0.248
3.4	0.079	0.107	0.134	0.165	0.200	0.233	0.263
3.6	0.084	0.113	0.142	0.175	0.212	0.247	0.279
3.8	0.089	0.120	0.150	0.185	0.224	0.261	0.295
4.0	0.094	0.126	0.158	0.195	0.236	0.275	0.311
4.2	0.098	0.133	0.167	0.204	0.248	0.289	0.327
4.4	0.103	0.139	0.175	0.214	0.260	0.303	0.343
4.6	0.108	0.146	0.183	0.224	0.272	0.317	0.359
4.8	0.113	0.152	0.191	0.234	0.284	0.331	0.375
5.0	0.118	0.159	0.199	0.244	0.296	0.345	0.391
5.5	0.130	0.175	0.220	0.270	0.327	0.381	0.431
6.0	0.142	0.191	0.240	0.295	0.357	0.417	0.471
6.5	0.154	0.208	0.261	0.320	0.388	0.453	0.512
7.0	0.166	0.224	0.282	0.346	0.419	0.489	0.553
7.5	0.179	0.241	0.303	0.372	0.450	0.525	0.594
8.0	0.191	0.258	0.324	0.397	0.482	0.562	0.635
8.5	0.204	0.275	0.345	0.423	0.513	0.598	0.677
9.0	0.216	0.292	0.366	0.450	0.545	0.635	0.718
9.5	0.229	0.309	0.388	0.476	0.576	0.672	0.760
10.0	0.242	0.326	0.409	0.502	0.608	0.710	0.802
11.0	0.267	0.360	0.452	0.556	0.673	0.785	0.888
12.0	0.293	0.395	0.496	0.609	0.738	0.861	0.974
13.0	0.319	0.431	0.541	0.664	0.804	0.938	1.061
14.0	0.346	0.466	0.585	0.719	0.871	1.016	1.149
15.0	0.373	0.502	0.631	0.774	0.938	1.094	1.237
16.0	0.400	0.539	0.677	0.831	1.006	1.174	1.327
17.0	0.427	0.576	0.723	0.888	1.075	1.254	1.418
18.0	0.455	0.613	0.770	0.945	1.145	1.336	1.510
19.0	0.483	0.651	0.817	1.004	1.216	1.418	1.603
20.0	0.511	0.689	0.865	1.062	1.287	1.501	1.697

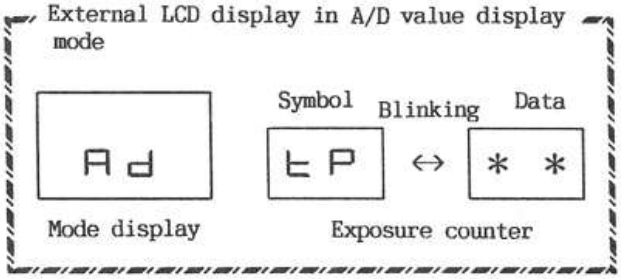
Temperature Adjustment

Purpose

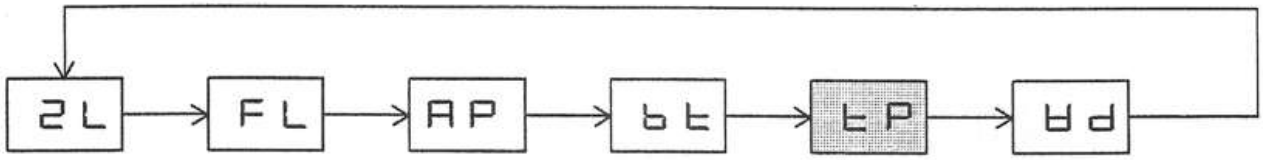
Make temperature adjustment before light metering adjustment and AF adjustment. Make this adjustment electrically.
(Be sure to make this temperature adjustment when the light metering adjustment or AF adjustment is to be made.)

Adjustment Procedure

① Set the camera in the first manual adjusting mode and then set it in the A / D value display mode by pressing the Rewind Switch four times. At the setting of this mode, " Ad " appears at the exposure compensation display position and the symbol of A / D conversion being performed and the A / D value blink alternately at the exposure counter.



② After the setting of the A / D value display mode, select the symbol " tP " of temperature A / D value by pressing the Shutter Release Button halfway down (Check Switch ON), while consulting the exposure counter display.



③ Read the current A / D value, which is blinking alternately with " tP " at the exposure counter, and select the adjusted value of temperature.

A-D value reading	49	4A	4B	4C	4D	4E	4F	50	51	52	53	54	55	56	57	58	59
Adjusted value of temperature	E0	E1	E2	E3	E4	E5	E6	E7	E8	E9	EA	EB	EC	ED	EE	EF	F0

A-D value reading	5A	5B	5C	5D	5E	5F	60	61	62	63	64	65	66	67	68	69	6A
Adjusted value of temperature	F1	F2	F3	F4	F5	F6	F7	F8	F9	FA	FB	FC	FD	FE	FF	00	01

A-D value reading	6B	6C	6D	6E	6F	70	71	72	73	74	75	76	77	78	79
Adjusted value of temperature	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	10

④ When the A / D value reading is not found in the table, the temperature detector system is faulty. In such a case, check the Vref voltage and the temperature output voltage level of the light metering IC.

⑤ Write the selected adjusted value in EEPROM in the adjusted value correction mode.

	EEPROM address for writing
Adjusted value of temperature at light metering adjustment	3B
Adjusted value of temperature at AF adjustment	2E

Light Metering Adjustments

Purpose

Adjust light metering values corresponding to brightnesses electrically.

Measuring Instrument

AE multi - tester

Preparation for Adjustment

① Make the temperature adjustment and write the adjusted values of temperature at light metering in EEPROM. (For details, see "Temperature Adjustment")

② In the adjusted value correction mode for manual adjustment, set the adjusted values of light metering of center and surrounding area to "00". If the adjusted values of light metering are not "00", the camera can not perform LV code display correctly in the adjusted value display mode.

		EEPROM address for writing
Adjusted value of light metering	LV8	3C
A / D value of center	LV15	3D
Adjusted value of A / D value defference between center and surrounding area		3E

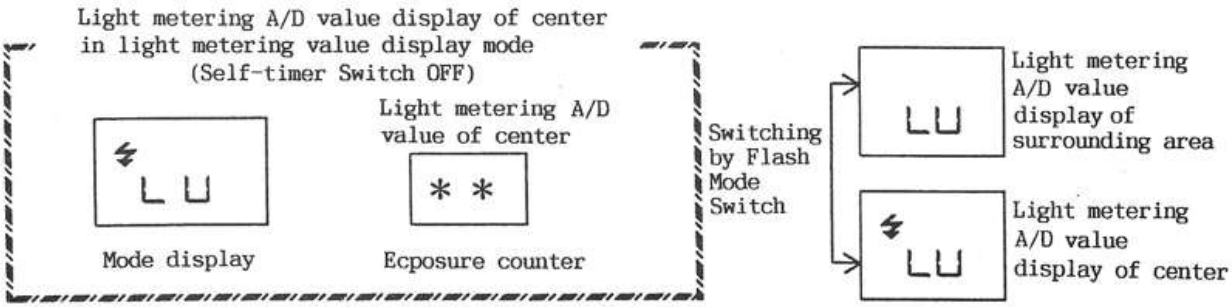
Set the data written at these three addresses to "00".

Adjustment Procedure

Make three light metering adjustments —— the adjustments of light metering A / D values at two points of EV8 and EV15 and the adjustment of A / D value difference between center and surrounding area at a point of EV15.

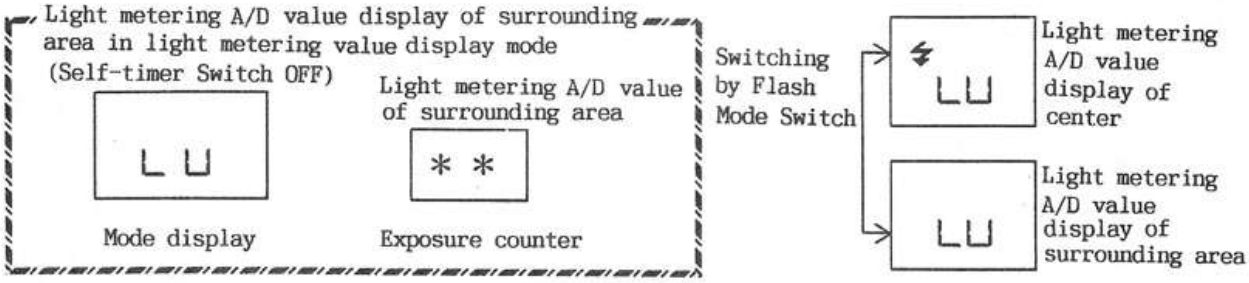
① Set the camera in the first manual adjusting mode and then set it in the light metering display mode by pressing the Rewind Switch six times. At the setting of this mode, " LU " appears at the exposure compensation display position.

② In this state, turn off the Self - timer Switch and press the Flash Mode Switch, and the exposure counter will display the light metering A / D value. (For details, see "Light Metering Value Display Mode")


Light metering A/D value display of center in light metering value display mode (Self-timer Switch OFF)
Light metering A/D value of center
LU
* *
Mode display
Ecposure counter
Switching by Flash Mode Switch
LU
Light metering A/D value display of surrounding area
LU
Light metering A/D value display of center

③ During the light metering A / D value display of center, bring the Light Metering Element of the camera into contact with the surface light source of the AE multi - tester. And read the light metering A / D values of center which are displayed on the exposure counter at the brightnesses of EV8 and EV15.

④ Change the display to that of the light metering A / D value of surrounding area by turning on the Flash Mode Switch and read the light metering A / D value of surrounding area which is displayed on the exposure counter at EV15.


Light metering A/D value display of surrounding area in light metering value display mode
(Self-timer Switch OFF)
Light metering A/D value of surrounding area
L U
* *
Mode display
Exposure counter
Switching by Flash Mode Switch
Light metering A/D value display of center
Light metering A/D value display of surrounding area

⑤ After reading, select the adjusted values of light metering A / D values of center (EV8 and EV15) from the following table.

Example: When light metering A / D values of center are LV8 = AA and LV15 = 6A,
Adjusted values of light metering of center are LV8 = F4 and LV15 = F5.

Adjusted value of light metering of center	Light metering A/D value of center (Exposure counter display)	
	LV8	LV15
E0	96	55
E1	97	56
E2	98	57
E3	99	58
E4	9A	59
E5	9B	5A
E6	9C	5B
E7	9D	5C
E8	9E	5D
E9	9F	5E
EA	A0	5F
EB	A1	60
EC	A2	61
ED	A3	62
EE	A4	63
EF	A5	64
F0	A6	65
F1	A7	66
F2	A8	67
F3	A9	68
F4	AA	69
F5	AB	6A
F6	AC	6B
F7	AD	6C

Adjusted value of light metering of center	Light metering A/D value of center (Exposure counter display)	
	LV8	LV15
F8	AE	6D
F9	AF	6E
FA	B0	6F
FB	B1	70
FC	B2	71
FD	B3	72
FE	B4	73
FF	B5	74
00	B6	75
01	B7	76
02	B8	77
03	B9	78
04	BA	79
05	BB	7A
06	BC	7B
07	BD	7C
08	BE	7D
09	BF	7E
0A	C0	7F
0B	C1	80
0C	C2	81
0D	C3	82
0E	C4	83
0F	C5	84
10	C6	85

⑥ After that, select the adjusted value of the A / D value difference between center and surrounding area from the table below.

Example: When light metering A / D value of center (LV15) = 68 and light metering A / D value of surrounding area (LV15) = 45,
Adjusted value of A / D value difference between center and surrounding area = 04.

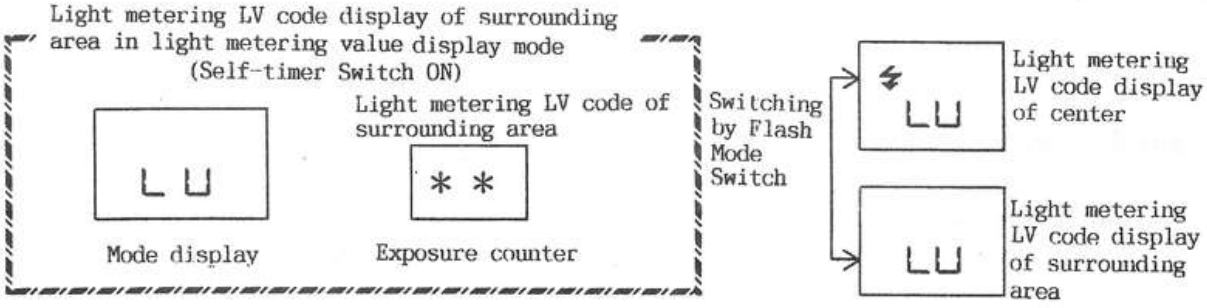
Light metering A/D value of center LV15	Light metering A/D value of surrounding area LV15																
55	3E	3D	3C	3B	3A	39	38	37	36	35	34	33	32	31	30	2F	2E
56	3F	3E	3D	3C	3B	3A	39	38	37	36	35	34	33	32	31	30	2F
57	40	3F	3E	3D	3C	3B	3A	39	38	37	36	35	34	33	32	31	30
58	41	40	3F	3E	3D	3C	3B	3A	39	38	37	36	35	34	33	32	31
59	42	41	40	3F	3E	3D	3C	3B	3A	39	38	37	36	35	34	33	32
5A	43	42	41	40	3F	3E	3D	3C	3B	3A	39	38	37	36	35	34	33
5B	44	43	42	41	40	3F	3E	3D	3C	3B	3A	39	38	37	36	35	34
5C	45	44	43	42	41	40	3F	3E	3D	3C	3B	3A	39	38	37	36	35
5D	46	45	44	43	42	41	40	3F	3E	3D	3C	3B	3A	39	38	37	36
5E	47	46	45	44	43	42	41	40	3F	3E	3D	3C	3B	3A	39	38	37
5F	48	47	46	45	44	43	42	41	40	3F	3E	3D	3C	3B	3A	39	38
60	49	48	47	46	45	44	43	42	41	40	3F	3E	3D	3C	3B	3A	39
61	4A	49	48	47	46	45	44	43	42	41	40	3F	3E	3D	3C	3B	3A
62	4B	4A	49	48	47	46	45	44	43	42	41	40	3F	3E	3D	3C	3B
63	4C	4B	4A	49	48	47	46	45	44	43	42	41	40	3F	3E	3D	3C
64	4D	4C	4B	4A	49	48	47	46	45	44	43	42	41	40	3F	3E	3D
65	4E	4D	4C	4B	4A	49	48	47	46	45	44	43	42	41	40	3F	3E
66	4F	4E	4D	4C	4B	4A	49	48	47	46	45	44	43	42	41	40	3F
67	50	4F	4E	4D	4C	4B	4A	49	48	47	46	45	44	43	42	41	40
68	51	50	4F	4E	4D	4C	4B	4A	49	48	47	46	45	44	43	42	41
69	52	51	50	4F	4E	4D	4C	4B	4A	49	48	47	46	45	44	43	42
6A	53	52	51	50	4F	4E	4D	4C	4B	4A	49	48	47	46	45	44	43
6B	54	53	52	51	50	4F	4E	4D	4C	4B	4A	49	48	47	46	45	44
6C	55	54	53	52	51	50	4F	4E	4D	4C	4B	4A	49	48	47	46	45
6D	56	55	54	53	52	51	50	4F	4E	4D	4C	4B	4A	49	48	47	46
6E	57	56	55	54	53	52	51	50	4F	4E	4D	4C	4B	4A	49	48	47
6F	58	57	56	55	54	53	52	51	50	4F	4E	4D	4C	4B	4A	49	48
70	59	58	57	56	55	54	53	52	51	50	4F	4E	4D	4C	4B	4A	49
71	5A	59	58	57	56	55	54	53	52	51	50	4F	4E	4D	4C	4B	4A
72	5B	5A	59	58	57	56	55	54	53	52	51	50	4F	4E	4D	4C	4B
73	5C	5B	5A	59	58	57	56	55	54	53	52	51	50	4F	4E	4D	4C
74	5D	5C	5B	5A	59	58	57	56	55	54	53	52	51	50	4F	4E	4D
75	5E	5D	5C	5B	5A	59	58	57	56	55	54	53	52	51	50	4F	4E
76	5F	5E	5D	5C	5B	5A	59	58	57	56	55	54	53	52	51	50	4F
77	60	5F	5E	5D	5C	5B	5A	59	58	57	56	55	54	53	52	51	50
78	61	60	5F	5E	5D	5C	5B	5A	59	58	57	56	55	54	53	52	51
79	62	61	60	5F	5E	5D	5C	5B	5A	59	58	57	56	55	54	53	52
7A	63	62	61	60	5F	5E	5D	5C	5B	5A	59	58	57	56	55	54	53
7B	64	63	62	61	60	5F	5E	5D	5C	5B	5A	59	58	57	56	55	54
7C	65	64	63	62	61	60	5F	5E	5D	5C	5B	5A	59	58	57	56	55
7D	66	65	64	63	62	61	60	5F	5E	5D	5C	5B	5A	59	58	57	56
7E	67	66	65	64	63	62	61	60	5F	5E	5D	5C	5B	5A	59	58	57
7F	68	67	66	65	64	63	62	61	60	5F	5E	5D	5C	5B	5A	59	58
80	69	68	67	66	65	64	63	62	61	60	5F	5E	5D	5C	5B	5A	59
81	6A	69	68	67	66	65	64	63	62	61	60	5F	5E	5D	5C	5B	5A
82	6B	6A	69	68	67	66	65	64	63	62	61	60	5F	5E	5D	5C	5B
83	6C	6B	6A	69	68	67	66	65	64	63	62	61	60	5F	5E	5D	5C
84	6D	6C	6B	6A	69	68	67	66	65	64	63	62	61	60	5F	5E	5D
85	6E	6D	6C	6B	6A	69	68	67	66	65	64	63	62	61	60	5F	5E
Adjusted value of A/D value difference between center and surrounding area	F8	F9	FA	FB	FC	FD	FE	FF	00	01	02	03	04	05	06	07	08

⑦ When the adjusted value of a light metering A / D value of center or the adjusted value of the A / D value difference between center and surrounding area is not found in the tables above, check the light metering system for abnormality.

⑧ Write the selected adjusted values in EEPROM in the adjusted value correction mode.

		EEPROM address for writing
Adjusted value of light metering A / D value of center	LV8	3C
	LV15	3D
Adjusted value of A / D value deifference between center and surrounding area		3E

⑨ Set the light metering value display mode again and turn on the Self - timer Switch, and the exposure counter will display an LV code. Then make sure that the value is in an allowable range.
If the value is not in the allowable range, make the light metering A / D value adjustment again.


Light metering LV code display of surrounding area in light metering value display mode (Self-timer Switch ON)
Light metering LV code of surrounding area
Mode display
Exposure counter
Switching by Flash Mode Switch
Light metering LV code display of center
Light metering LV code display of surrounding area

The LV code displays of surrounding area and center must be both within the allowable ranges at the test brightnesses.

Test brightness	LV code allowable range of center and surrounding area
LV15	1E、1F、20、21、22
LV12	36、37、38、39、3A
LV8	56、57、58、59、5A

Within±0.25LV

Light Exposure Adjustment (incl. Aperture Size Adjustment)

Purpose

Adjust the measuring light exposure through the lens system.
The adjustment can be made by increasing or decreasing the adjusted value of light exposure in 0.125EV steps for all brightness. On the high brightness (EV15 and above) side, however, shutter delay adjustment is more effective than the light exposure adjustment. On this side, therefore, make the shutter delay adjustment after the light exposure adjustment.
When making the light exposure adjustment, make the aperture size adjustment at the same time.
Make the light exposure adjustment after the completion of the light metering adjustments.

Measuring Instrument

AE multi - tester

Preparation for Adjustment

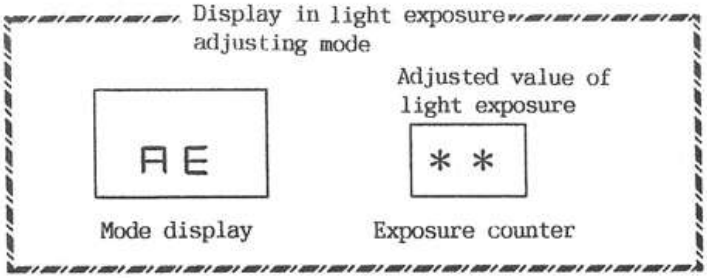
① In the adjusted value correction mode for manual adjustment, set all the adjusted values of aperture sizes F3.5 ~ F16 to "00". (In order to make the aperture size adjustment at the same time)

		EEPROM address for writing
Adjusted value of aperture size	F3.5	40
	F4	41
	F5.6	42
	F8	43
	F11	44
	F16	45

Set the data written at these six addresses to "00".

Adjustment Procedure

① Set the camera in the first manual adjusting mode and then set it in the light exposure adjusting mode by pressing the Rewind Switch seven times. At the setting of this mode, " AE " appears at the exposure compensation display position and the exposure counter displays the adjusted value of light exposure.



② Turn on the Release Switch in this mode, and the camera will perform light exposure and operate the shutter. In this operation, the value displayed at the exposure counter is used as the adjusted value of exposure. Other conditions are as follows:

ISO value:	Value read from DX code (ISO 100 without film)
A / D adjusted value of light metering:	Value written in EEPROM
Adjusted value of aperture size:	Value written in EEPROM
Adjusted value of shutter delay:	Value written in EEPROM
Flash mode:	Flash - off mode
Zoom and aperture setting:	Value read and set at each time
Exposure compensation:	Ignored (regarded as no compensation)
AF Lens position:	Infinity position

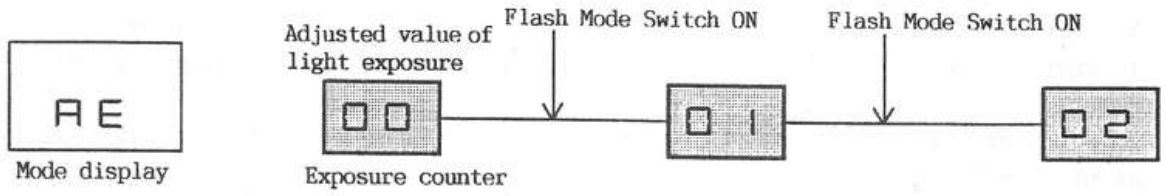
③ Set the camera to "WIDE" and "F3.5" and increase or decrease the adjusted value of light exposure so that the measuring light exposure errors △ EV at the brightnesses EV15 and EV8 of the AE multi - tester are in the allowable range.

Camera conditions	Light exposure adjustment brightness	Allowable range
WIDE	EV8	−0.8EV ～ +0.8EV
F3.5	EV12	

④ The increase and decrease of the adjusted value of light exposure can be performed by means of the Flash Mode Switch combined with the Self - timer Switch position.

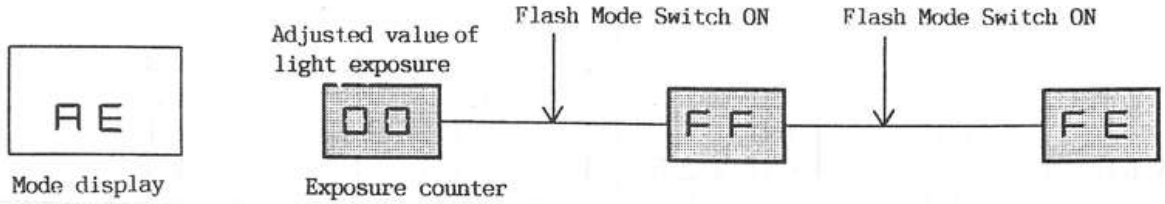
Increment of adjusted value of light exposure: The adjusted value is incremented one by one at each turning on of the Flash Mode Switch with the Self - timer Switch in the OFF position.

《 Self - timer Switch OFF 》



Decrement of adjusted value of light exposure: The adjusted value is decremented one by one at each turning on of the Flash Mode Switch with the Self - timer Switch in the ON position.

《 Self - timer Switch ON 》



⑤ The adjusted value of light exposure can be chenged in 1 / 8 EV (0.125EV) steps.

Adjusted value of light exposure	△EV
F0	+2.000
F1	+1.875
•	•
FA	+0.750
FB	+0.625
FC	+0.500
FD	+0.375
FE	+0.250
FF	+0.125
00	±0
01	−0.125
02	−0.250
03	−0.375
04	−0.500
05	−0.625
06	−0.750
•	•
0F	−1.875
10	−2.000

The adjustment must be made within ± 2EV.
If the range of ± 2EV is exceded, make the light metering adjustments again and then make this adjustment.

⑥ When the adjustment has been made within the allowable range, adjust manual aperture setting.
With the camera kept in the light metering adjusting mode, change the aperture in 1 - click steps from F4 and measure the measuring light exposure error △ EV at each aperture. (Measure the measuring light exposure error at each of F4, F5.6, F8, F11 and F16.)
For this measurement, set the brightness of the AE multi - tester to EV12.

⑦ Adjusted values for the aperture size are available in 1 / 8EV (0.125EV) steps for each aperture. Select the adjusted value corresponding to the measuring light exposure error △ EV measured at each aperture.
Since the light exposure adjustment (the preceding adjustment) is made at F3.5, the adjusted value of aperture size F3.5 remains "00".
Write the selected adjusted values of the aperture size in EEPROM in the adjusted value correction mode and check the measuring light exposure.

Aperture size adjustment brightness	Adjusted value of aperture size	△EV
	FC	+0.500
	FD	+0.375
	FE	+0.250
EV12	FF	+0.125
	00	±0
WIDE	01	−0.125
	02	−0.250
	03	−0.375
	04	−0.500

Adjusted value of aperture size	EEPROM address for writing
F3.5	40
F4	41
F5.6	42
F8	43
F11	44
F16	45

Shutter Delay Adjustment

Purpose

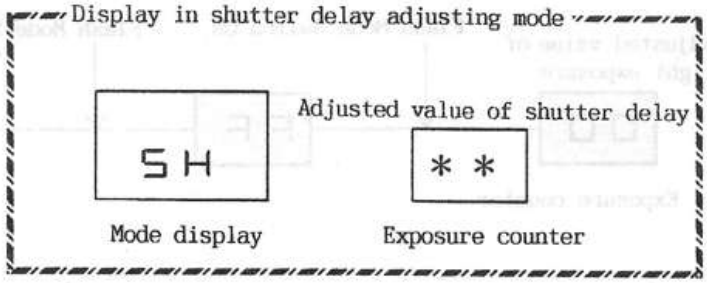
After the light metering adjustment and light exposure adjustment, adjust the measuring light exposure on the high brightness (high speed) side by a fine adjustment of shutter delay time.
The measuring light exposure on the high - brightness side depends on the shutter delay adjustment rather than the light exposure adjustment. Therefore, after completion of the measuring light exposure ad - justments at low brightness (EV8) and medium brightness (EV12), adjust the measuring light exposure at high brightness.

Measuring Instrument

AE multi - tester

Adjustment Procedure

① Set the camera in the first manual adjusting mode and then set it in the shutter delay adjusting mode by pressing the Rewind Switch eight times. At the setting of this mode, "SH" appears at the exposure compensation display position and the exposure counter displays the adjusted value of shutter delay.



② Turn on the Release Switch in this mode, and the camera will perform light metering and operate the shutter. In this operation, the value displayed at the exposure counter is used as the adjusted value of shutter delay. Other conditions are as follows:

ISO value:	Value read from DX code (ISO 100 without film)
A / D adjusted value of light metering:	Value written in EEPROM
Adjusted value of aperture size:	Value written in EEPROM
Adjusted value of light exposure:	Value written in EEPROM
Flash mode:	Flash - off mode
Zoom and aperture setting:	Value read and set at each time
Exposure compensation:	Ignored (regarded as no compensation)
AF Lens position:	Infinity position

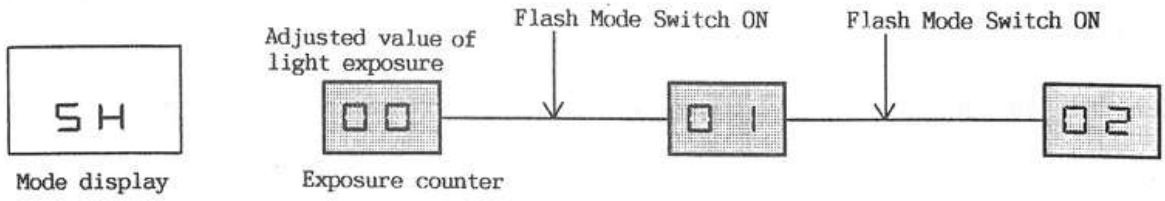
③ Set the camera to "WIDE" and "F3.5" and increase or decrease the adjusted value of light exposure so that the measuring light exposure error at the brightness EV15 of the AE multi - tester are in the allowable range.

Shutter delay adjustment brightness	Allowable range
EV15	−1.0 EV ～ +1.0 EV

④ The increase and decrease of the adjusted value of shutter delay can be performed by means of the Flash Mode Switch combined with the Self - timer Switch position.

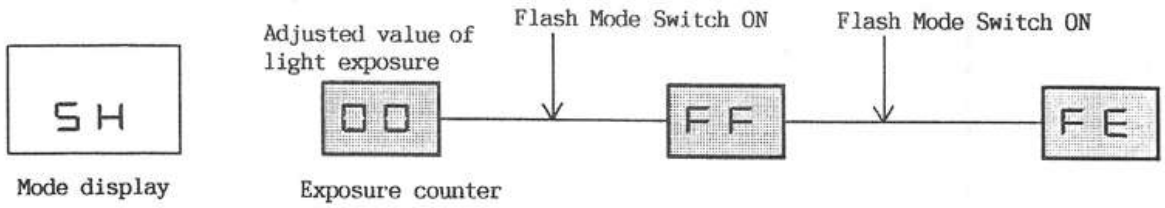
Increment of adjusted value of shutter delay: The adjusted value is incremented one by one at each turning on of the Flash Mode Switch with the Self - timer Switch in the OFF position.

《 Self - timer Switch OFF 》



Decrement of adjusted value of shutter delay: The adjusted value is decremented one by one at each turning on of the Flash Mode Switch with the Self - timer Switch in the ON position.

《 Self - timer Switch ON 》



⑤ The shutter delay time is the basic value, or 1500 μ sec., when the adjusted value is "00". It changes in 50 μ sec. stops. (At EV15, change of about 3 ~ 4 steps corresponds to change of 0.125EV.)

Adjusted value	E2	E3	E4	・・	FE	FF	00	01	02	・・	1C	1D	1E
Time (μsec)	0	50	100	・・	1400	1450	1500	1550	1600	・・	2900	2950	3000

The adjustment must be made in a range of E2 to 1E. If this range is exceeded, check the shutter for abnormality.

AF Adjustment

Purpose

Make adjustment so that the distance data value corresponding to a camera - to - subject distance will be constant.

Adjusting Tools

- White chart or gray chart of 18% reflectivity
- Measure (measuring up to 3m possible)
- Tripod

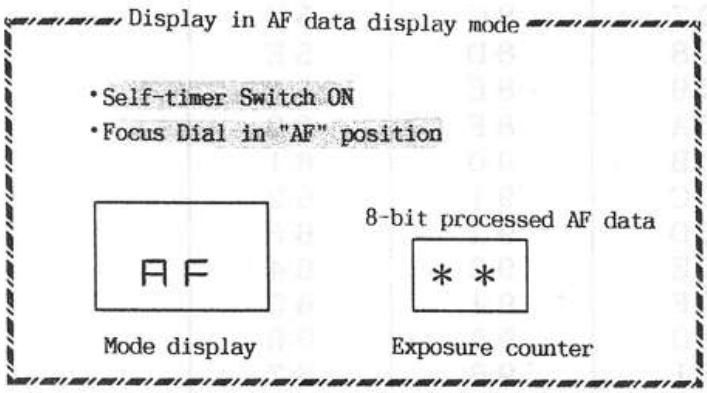
Preparation for Adjustment

① Make the temperature adjustment and write the adjusted value of temperature at the AF adjustment in EEPROM. (For details, see "Temperature Adjustment")

Adjustment Procedure

① Set the camera in the first manual adjusting mode and then set it in the AF data display mode by press - ing the Rewind Switch nine times. At the setting of this mode, " AF " appears at the exposure com - pensation display position.

② In this state, turn on the Self - timer Switch and set the Focus Dial in the "AF" position, and emission of the AF - assist beam and switching between sensor sensitivities will be automatically controlled. And the exposure counter will display 8 - bit processed AF data at each second.



③ Fix the camera on the tripod and set it so that the distance metering frame of the viewfinder is positioned at the center of the chart.

④ Read the 8 - bit processed data which are displayed on the exposure counter at three adjustment distances.

AF adjustment distance	0.5m	1.0m	2.95m

⑤ After reading the 8 - bit processed data at three AF adjustment distances, select AF adjusted values from the follwing table.

Adjusted value of distance metering data	8-bit processed data (Exposure counter display value)		
	0.5m	1.0m	2.95m
F0	C1		
F1	C2		
F2	C3		
F3	C4		
F4	C5		
F5	C6	7B	
F6	C7	7C	
F7	C8	7D	4E
F8	C9	7E	4F
F9	CA	7F	50
FA	CB	80	51
FB	CC	81	52
FC	CD	82	53
FD	CE	83	54
FE	CF	84	55
FF	D0	85	56
00	D1	86	57
01	D2	87	58
02	D3	88	59
03	D4	89	5A
04	D5	8A	5B
05	D6	8B	5C
06	D7	8C	5D
07	D8	8D	5E
08	D9	8E	5F
09	DA	8F	60
0A	DB	90	61
0B	DC	91	62
0C	DD	92	63
0D	DE	93	64
0E	DF	94	65
0F	E0	95	66
10	E1	96	67
11		97	68
12		98	69
13		99	6A
14		9A	6B
15		9B	6C
16			6D
17			6E

Example:

8-bit processed data (Exposure counter display value)
0.5m=CF 1.0m=89 2.95m=5C

↓

Adjusted value of distance metering data
0.5m=FE 1.0m=03 2.95m=05

⑥ When the values of 8 – bit processed data displayed on the exposure counter at the adjustment distances are not found in the table, check the distance metering system for abnormality.

⑦ Write the selected adjusted values of distance metering in EEPROM in the adjusted value correction mode.

		EEPROM address for writing
Adjusted value of distance metering	0.5m	2F
	1.0m	30
	2.95m	31

Address (Hex.)	Initial adjusted value (Hex.)	Basic design value (Hex.)	Description
Backup Data Area			
00	00	None	Address for current use of exposure counter
01	00	None	Address for current use of status information
02	-	None	Address for current use of winding threshold level "L"
03	-	None	Address for current use of winding threshold level "H"
04	00	None	Address for current use of shot count "L"
05	00	None	Address for current use of shot count "H"
06	00	None	Address for current use of flash mode home position
07	00	None	Address for current use of user custom data
08	00	None	Exposure counter value
09	00	None	Status information value
0A	-	None	Winding threshold level "L" value
0B	-	None	Winding threshold level "H" value
0C	00	None	Shot count "L" value
0D	00	None	Shot count "H" value
0E	00		Flash mode home position
0F	10		User custom data

Address (Hex.)	Initial adjusted value (Hex.)	Basic design value (Hex.)	Description	
Adjusted Value Area				
10	F0	BA	Adjusted value of A / D value of battery check B2bo level (2.543V)	
11	00	9A	Adjusted value of A / D value of battery check B2LB level (2.105V)	
12	00	06	Adjusted value of battery check DB value (B1 - B2) (82.03mV)	
13	00	DB	Adjusted value of A / D value of flash charge completion level (3.0V = 285V)	
14	08	1mS	Adjusted value 1 of delay time at winding stop (~ 250ms) 1ms step	
15	FB	7mS	Adjusted value 2 of delay time at winding stop (250ms ~) 1ms step	
16	FC	30mS	Adjusted value of brake time	1ms step
17	00	03	Adjusted value 1 of infinity position pulse (focal length 28 ~ 29 mm)	
18	00	03	Adjusted value 2 of infinity position pulse (focal length 30 ~ 34 mm)	
19	00	03	Adjusted value 3 of infinity position pulse (focal length 35 ~ 39 mm)	
1A	00	03	Adjusted value 4 of infinity position pulse (focal length 40 ~ 44 mm)	
1B	00	03	Adjusted value 5 of infinity position pulse (focal length 45 ~ 49 mm)	
1C	00	03	Adjusted value 6 of infinity position pulse (focal length 50 ~ 54 mm)	
1D	00	03	Adjusted value 7 of infinity position pulse (focal length 55 ~ 56 mm)	
1E	FF	3.0mS	Hold time of adjust pulse	At even number (2 ~ 6)
1F	FF	2.4mS	output for AF set drive stop	At even number (8 ~ 16)
20	FF	1.8mS	(Adjusted value ① of	At even number (18 ~ 24)
21	FF	1.8mS	shutter operation)	At even number (26 ~ 36)
22	FF	4.5mS		At odd number (1)
23	FF	4.0mS		At odd number (3 ~ 13)
24	FF	3.0mS		At odd number (15 ~ 25)
25	FF	3.0mS		At odd number (27 ~ 35)
26	00	1.2mS	Hold time of 6 pulse output for shutter blind drive (Adjusted value ⑤)	
27	00	1.5mS	Adjusted value of shutter delay: T AED time	
28	13	6.0mS	Shutter blade drive 11 pulse output hold time (Adjusted value ②)	*
29	00	1.6mS	Shutter blade drive 10 ~ 7 pulse output hold time (Adjusted value ③)	

Address (Hex.)	Initial adjusted value (Hex.)	Basic design value (Hex.)	Description
2A	00	2.5mS	Shutter blade drive 7 ～ 5 pulse output hold time (Adjusted value ④) *
2B	00	6.0mS	Shutter blade drive 4 ～ −3 pulse output hold time (Adjusted value ⑥) *
2C	00	00	Adjusted value of flash firing timing delay: T FMD time
2D	00	00	Adjusted value of flash firing GNo. control time
2E	00	69	Adjusted value of temperature at AF adjustment (difference from 25 °C = $69)
2F	00	D1	Adjusted value of distance metering data 0.5m
30	00	86	Adjusted value of distance metering data 1.0m
31	00	57	Adjusted value of distance metering data 2.95m
32	00	10	Adjusted value of 100 / L WIDE: At lens drive pulse $03
33	00	6A	Adjusted value of 100 / L WIDE: At lens drive pulse $0F
34	00	C9	Adjusted value of 100 / L WIDE: At lens drive pulse $1D
35	00	10	Adjusted value of 100 / L NORMAL:At lens drive pulse $03
36	00	69	Adjusted value of 100 / L NORMAL:At lens drive pulse $0F
37	00	C7	Adjusted value of 100 / L NORMAL:At lens drive pulse $1D
38	02	10	Adjusted value of 100 / L TELE: At lens drive pulse $03
39	05	68	Adjusted value of 100 / L TELE: At lens drive pulse $0F
3A	05	C2	Adjusted value of 100 / L TELE: At lens drive pulse $1D
3B	00	69	Adjusted value of temperature at light metering adjustment (difference from 25 °C =$69)
3C	00	B6	Adjusted value of light metering A / D value LV8
3D	00	75	Adjusted value of light metering A / D value LV15
3E	00	1F	Adjusted value of A / D value difference between center and surrounding area (3.875EV)
3F	00	00	Adjusted value of light exposure (for all apertures)
40	00	00	Adjusted value of aperture size F3.5
41	00	00	Adjusted value of aperture size F4
42	00	00	Adjusted value of aperture size F5.6
43	00	00	Adjusted value of aperture size F8
44	00	00	Adjusted value of aperture size F11
45	00	00	Adjusted value of aperture size F16
46	00	08	Adjusted value of auto flash firing condition at backlight (adjusted value of LV code difference between center and surrounding area) (1LV)
47	00	05	Adjusted value of A / D value at Main Switch ON / OFF boundary of Zoom Ring
48	00	5D	Adjusted value of A / D value at WIDE end position of Zoom Ring
49	00	EB	Adjusted value of A / D value at TELE end position of Zoom Ring
4A	00	11	Adjusted value of A / D value at "AF" position of Focus Dial

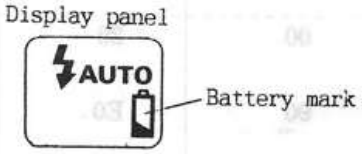
Address (Hex.)	Initial adjusted value (Hex.)	Basic design value (Hex.)	Description
4B	00	2F	Adjusted value of A / D value at " ∞ " position of Focus Dial
4C	00	E4	Adjusted value of A / D value at "0.5" position of Focus Dial
4D	00	20	Adjusted value of A / D value at "P" position of Aperture Ring
4E	00	E0	Adjusted value of A / D value at "F16" position of Aperture Ring
4F	00	00	Adjusted value of V REF voltage
50	00	00	Adjusted value of temperature sensor A / D value
51	00	00	Error history 1
52	00	00	Error history 2
53	10	400mS	Stop control time at rewinding for film leader remains outside cartridge, 10ms step
54	05	250mS	Remaining 5 − pulse time for delay time determination at blank shots advance or rewinding, 10ms step
55	00	08	LV code limit of center : LV code of surrounding area ± 8 (± 1LV)
56	00	00	Not used at repair
57	00	00	
58	00	00	
59	00	00	
5A	00	00	
5B	00	00	
5C	00	00	
5D	00	00	
5E	00	00	
5F	00	00	

C - 2. OTHERS

C - 2 - 1. Battery Check

* At repair, there is no need to adjust the Main FPC Ass'y supplied as a service part, whose battery check adjustment is completed at the factory before shipment. However, never change the basic desigh value (Hex.) of No. 10, 11 or 12.

When the battery check voltage is 2.5V, the battery mark lights up on the display panel.
After that, when the voltage has dropped to 2.1V in standby mode (where viewfinder displays are out), the displays on the exposure counter and display panel go out and the camera stops operating.

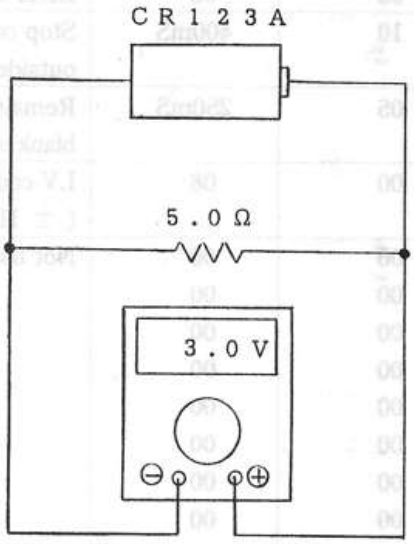


[Measuring of Battery Voltage]

Load the battery with a resistance of 5.0 Ω and measure the voltage 30 msec later.

The voltage must be 2.5V or higher.

Notes:
Take care not to measure the battery voltage too long; otherwise, the battery is consumed.

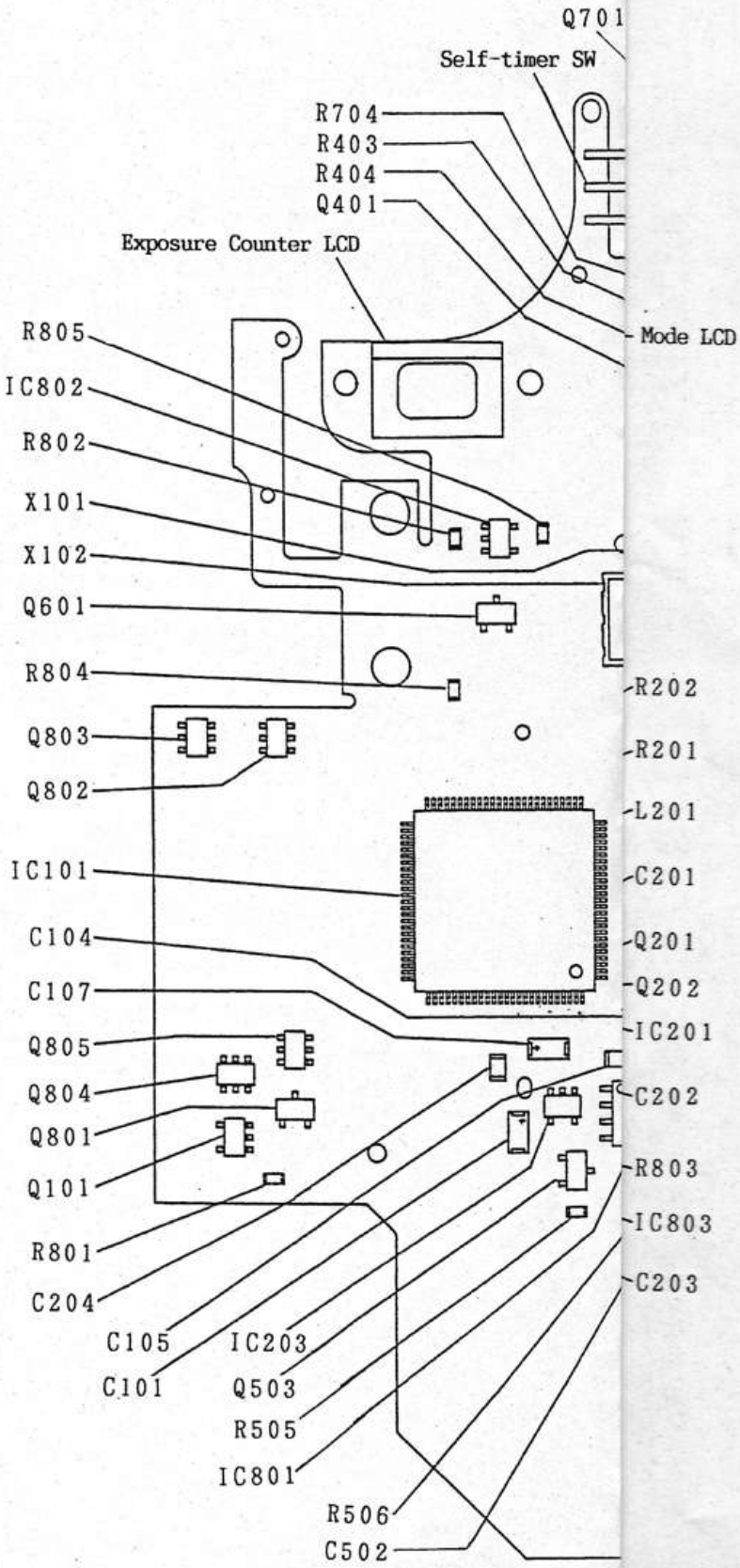


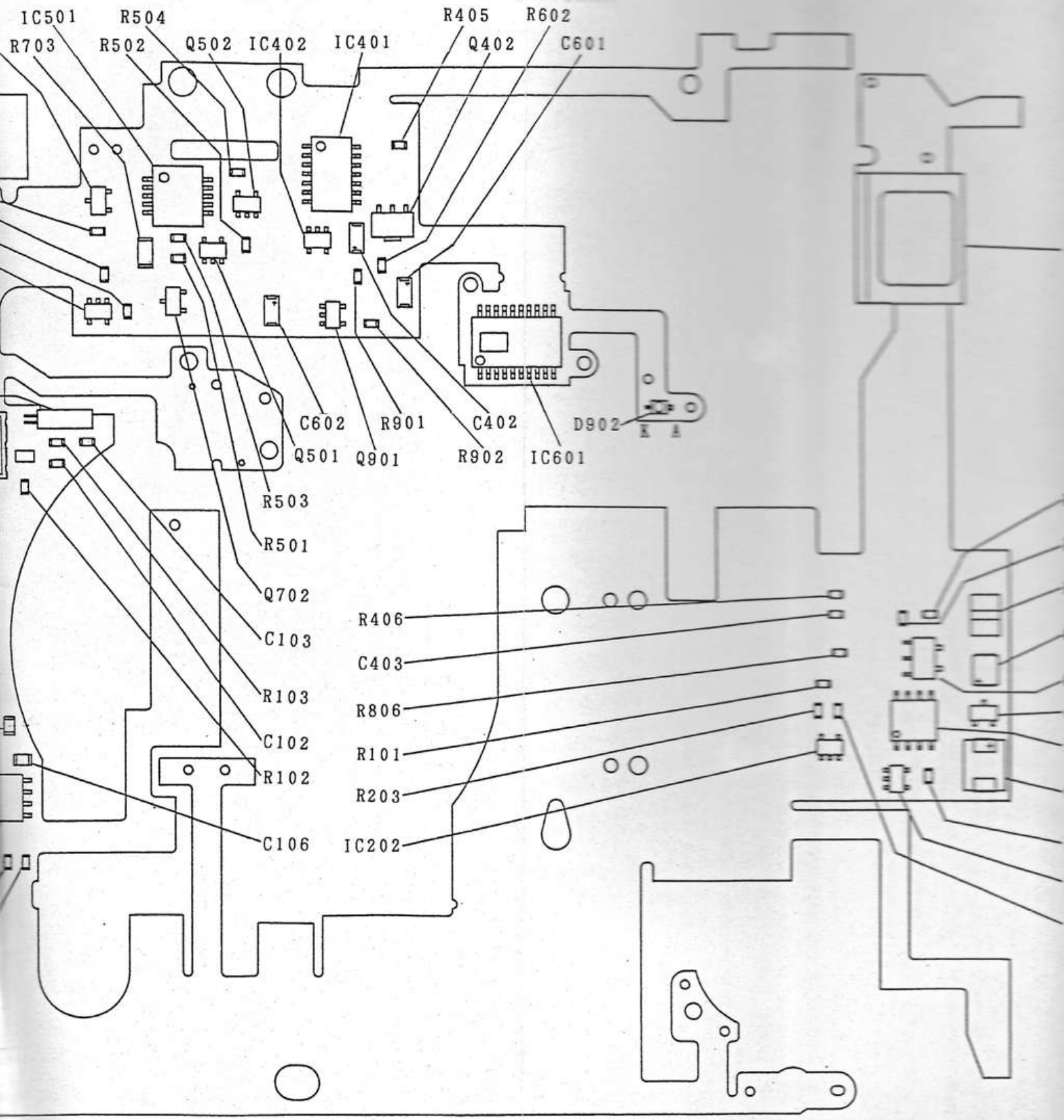
C - 2 - 2. Current Consumption

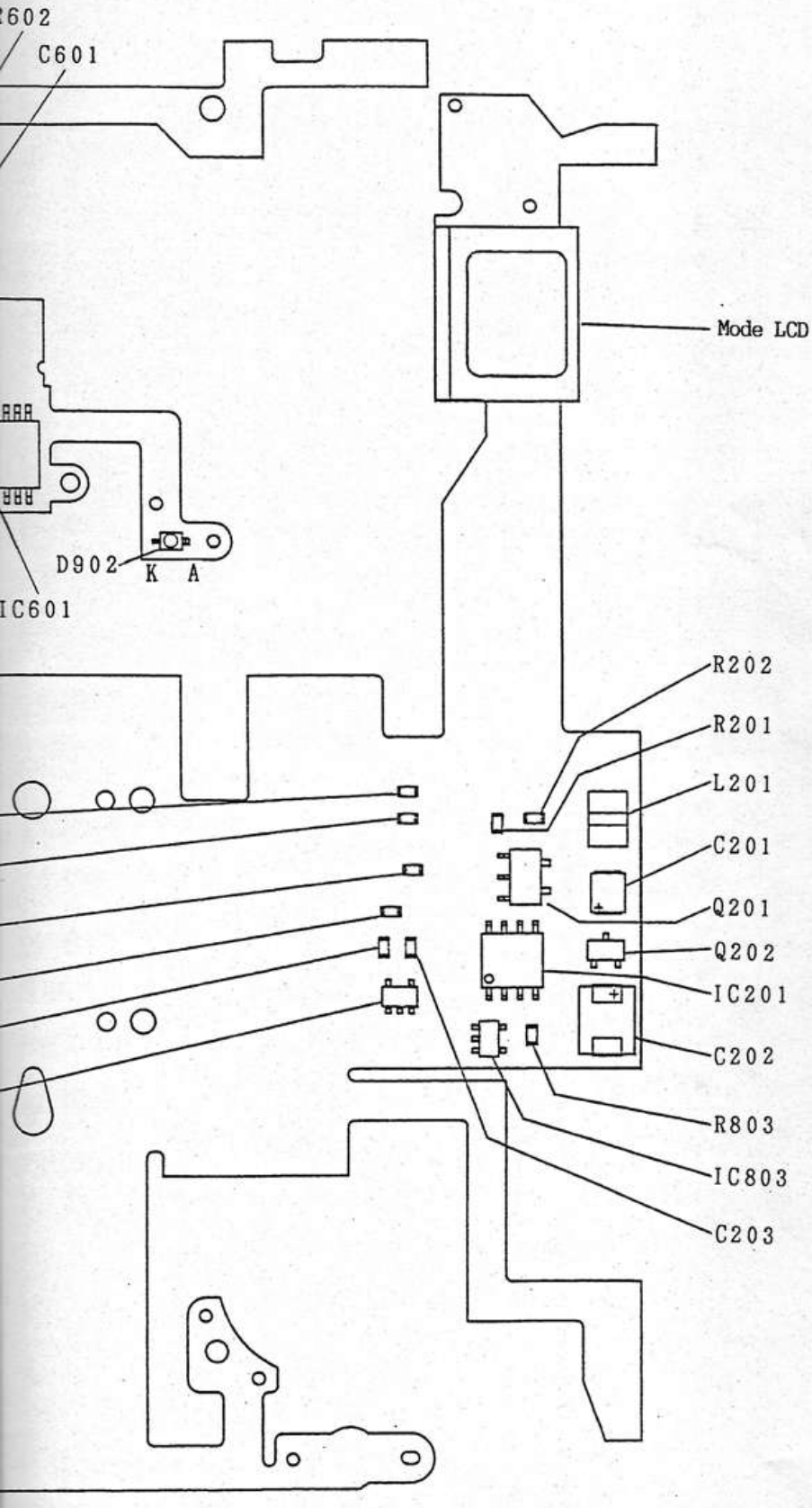
· Standby current	20 μA or below
· Film winding current	500mA or below (Check with film loaded)
· Film rewinding current	500mA or below (Check with film loaded)
· AF operation current	450mA or below

* Check at constant voltage of 3.0V.

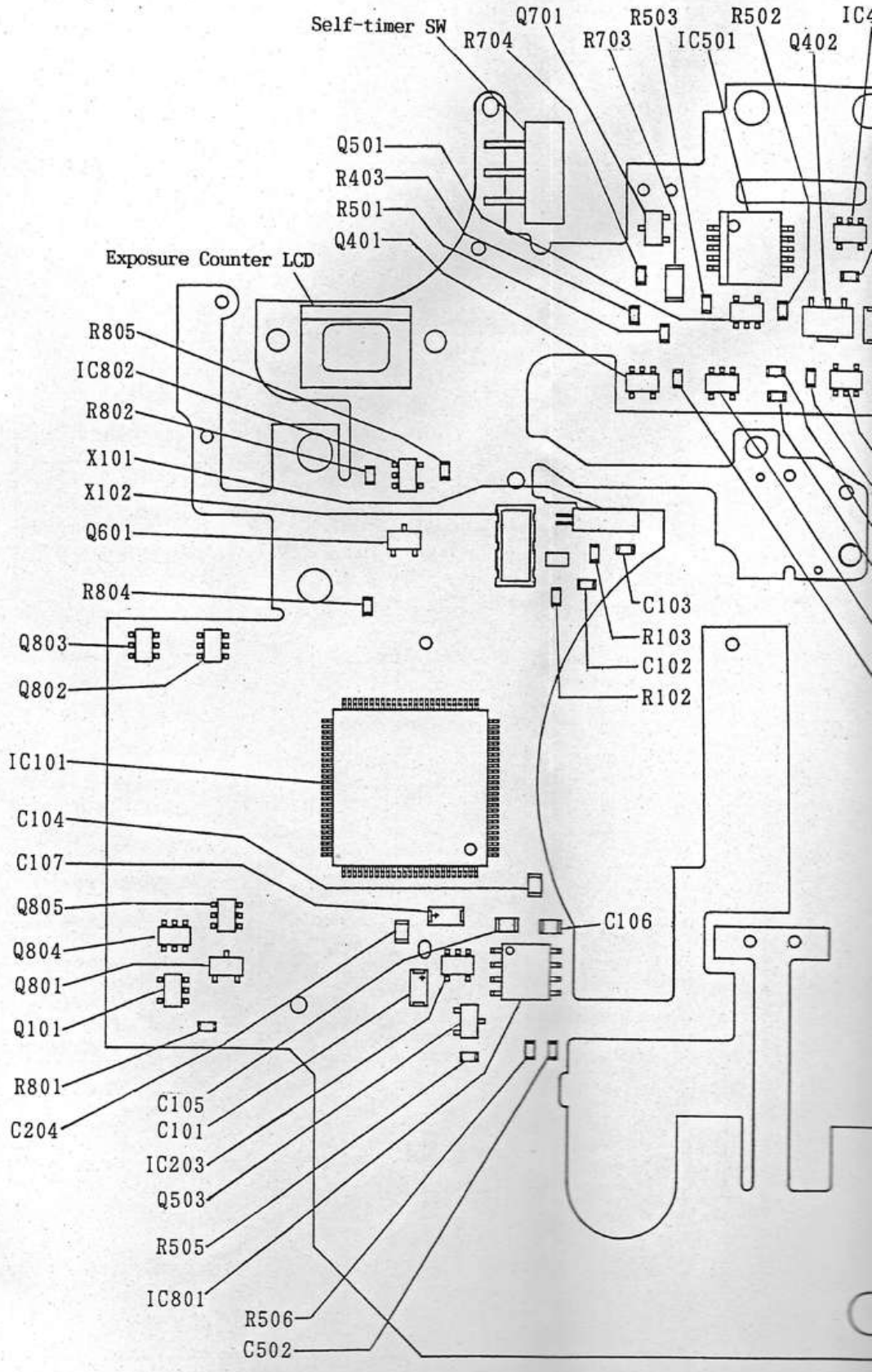
ELECTRIC PARTS ON OLD MAIN FPC ASS'Y

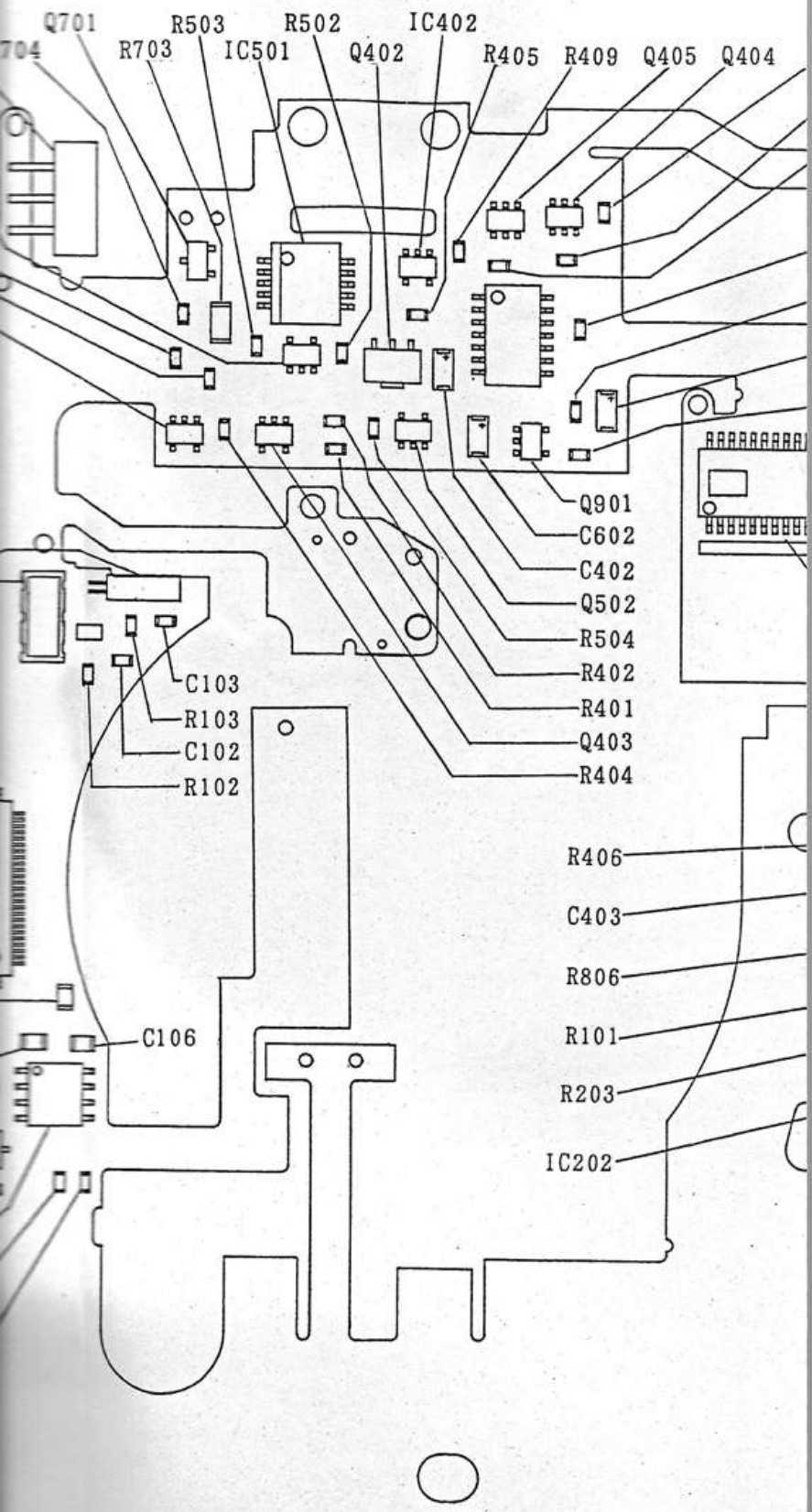


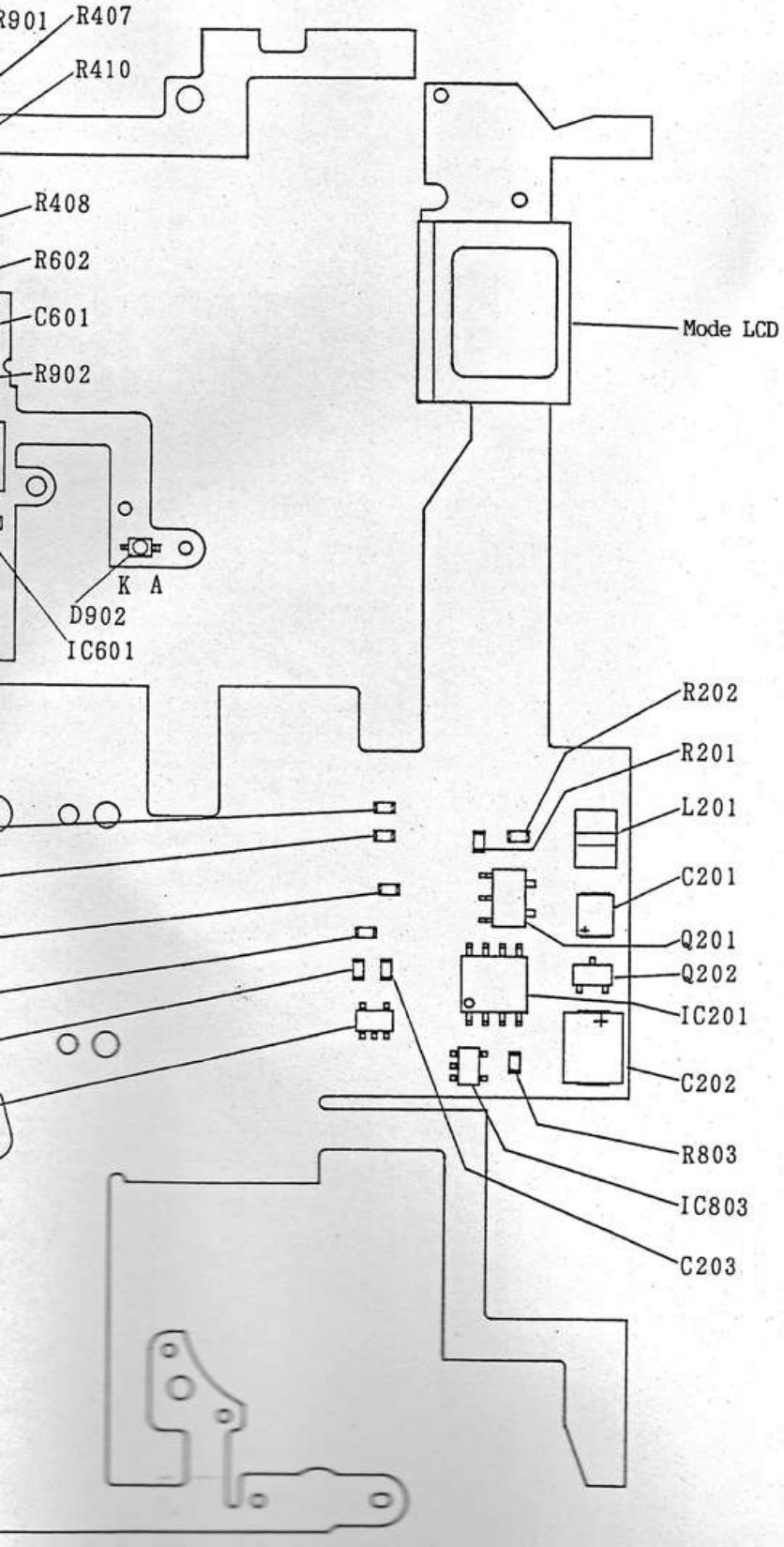

IC501
R504
R405
R602
R703
R502
Q502
IC402
IC401
Q402
C601
C602
R901
C402
D902
Q501
Q901
R902
IC601
R503
R501
Q702
R406
C103
C403
R103
R806
C102
R101
R102
R203
C106
IC202


2602
C601
Mode LCD
D902
K A
IC601
R202
R201
L201
C201
Q201
Q202
IC201
C202
R803
IC803
C203

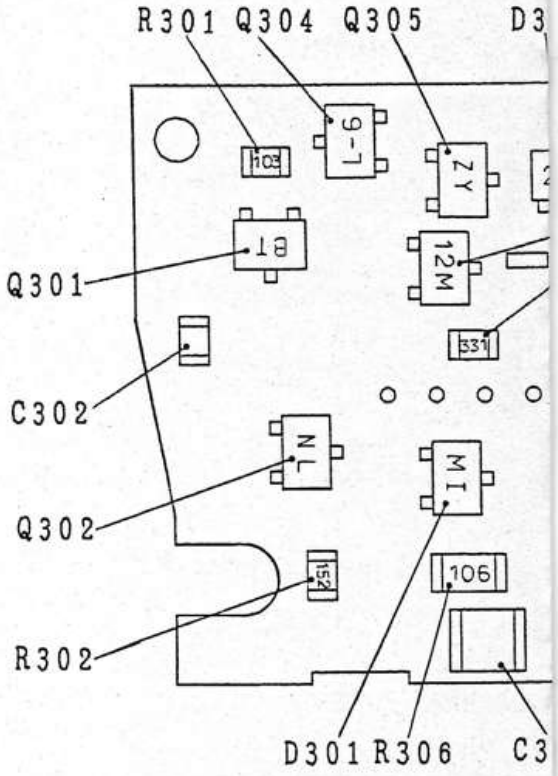
ELECTRIC PARTS ON NEW MAIN FPC ASS'Y



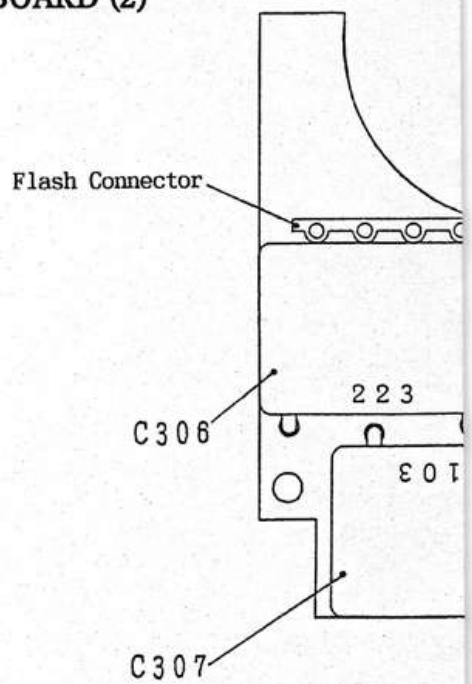

Q701
R503
R502
IC402
704
R703
IC501
Q402
R405
R409
Q405
Q404
Q901
C602
C402
Q502
R504
R402
R401
Q403
R404
C103
R103
C102
R102
R406
C403
R806
R101
R203
IC202
C106

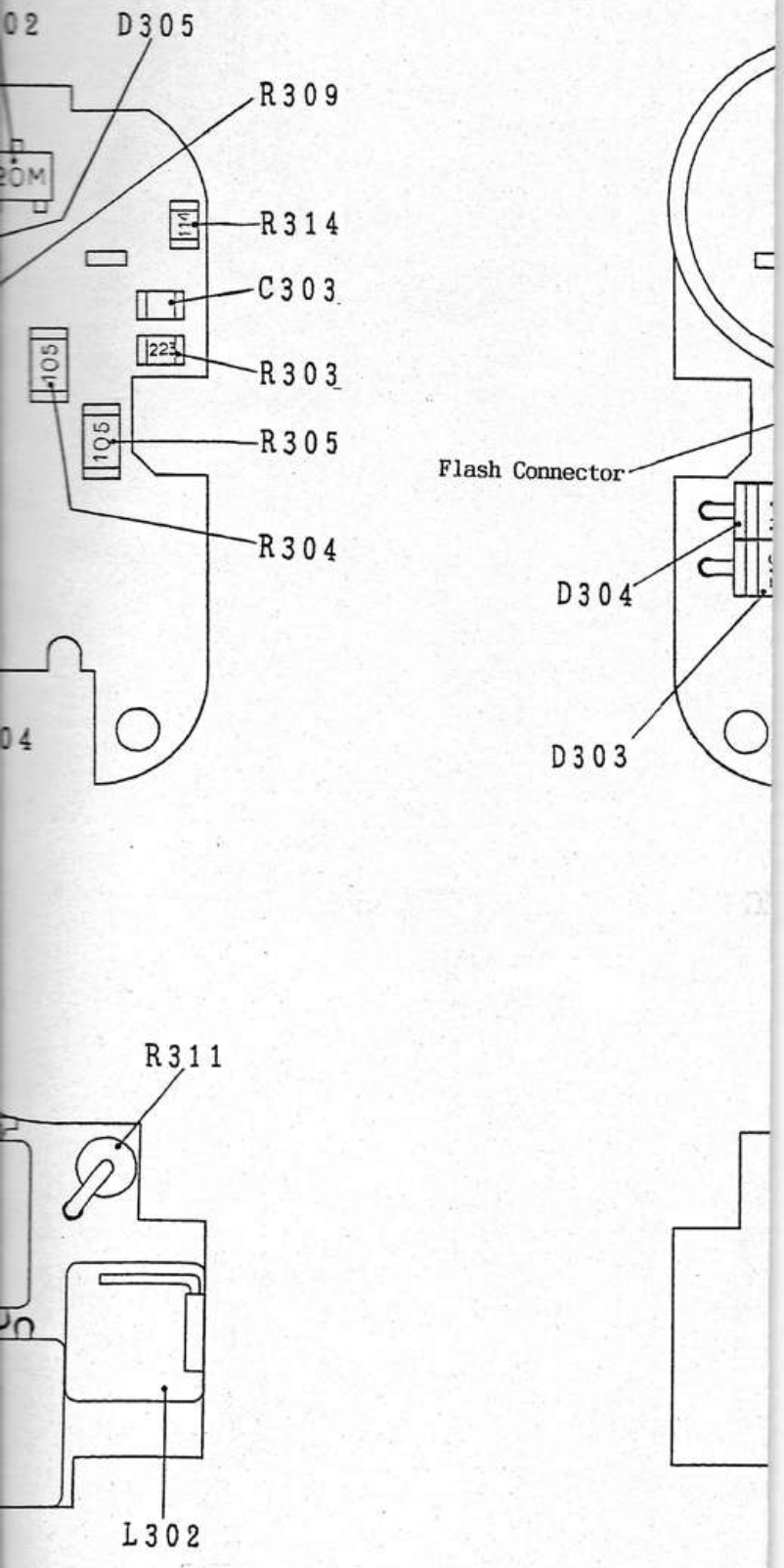

R901
R407
R410
R408
R602
C601
R902
Mode LCD
K A
D902
IC601
R202
R201
L201
C201
Q201
Q202
IC201
C202
R803
IC803
C203

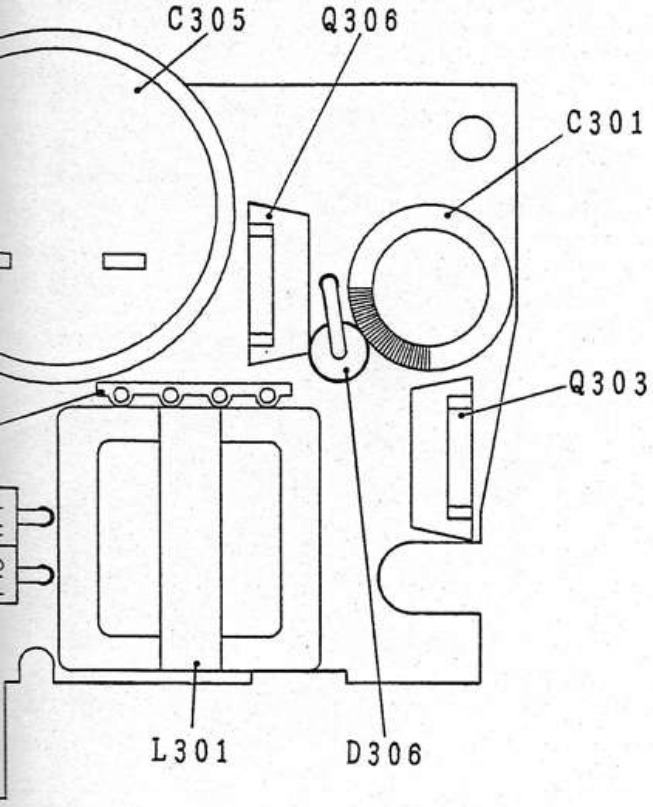
ELECTRIC PARTS ON FLASH BOARD (1)

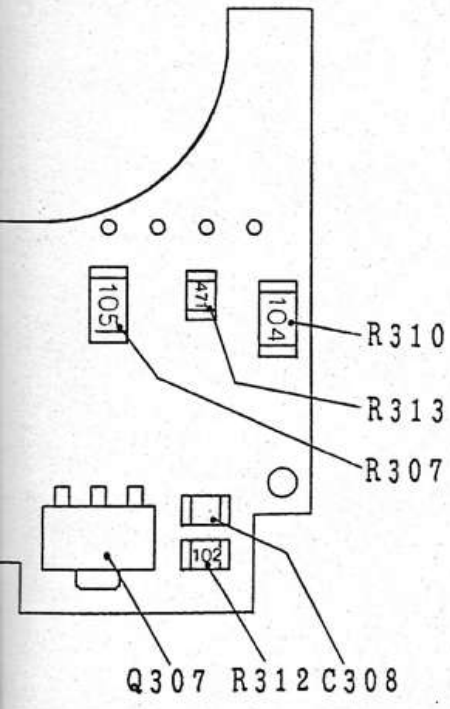


ELECTRIC PARTS ON FLASH BOARD (2)

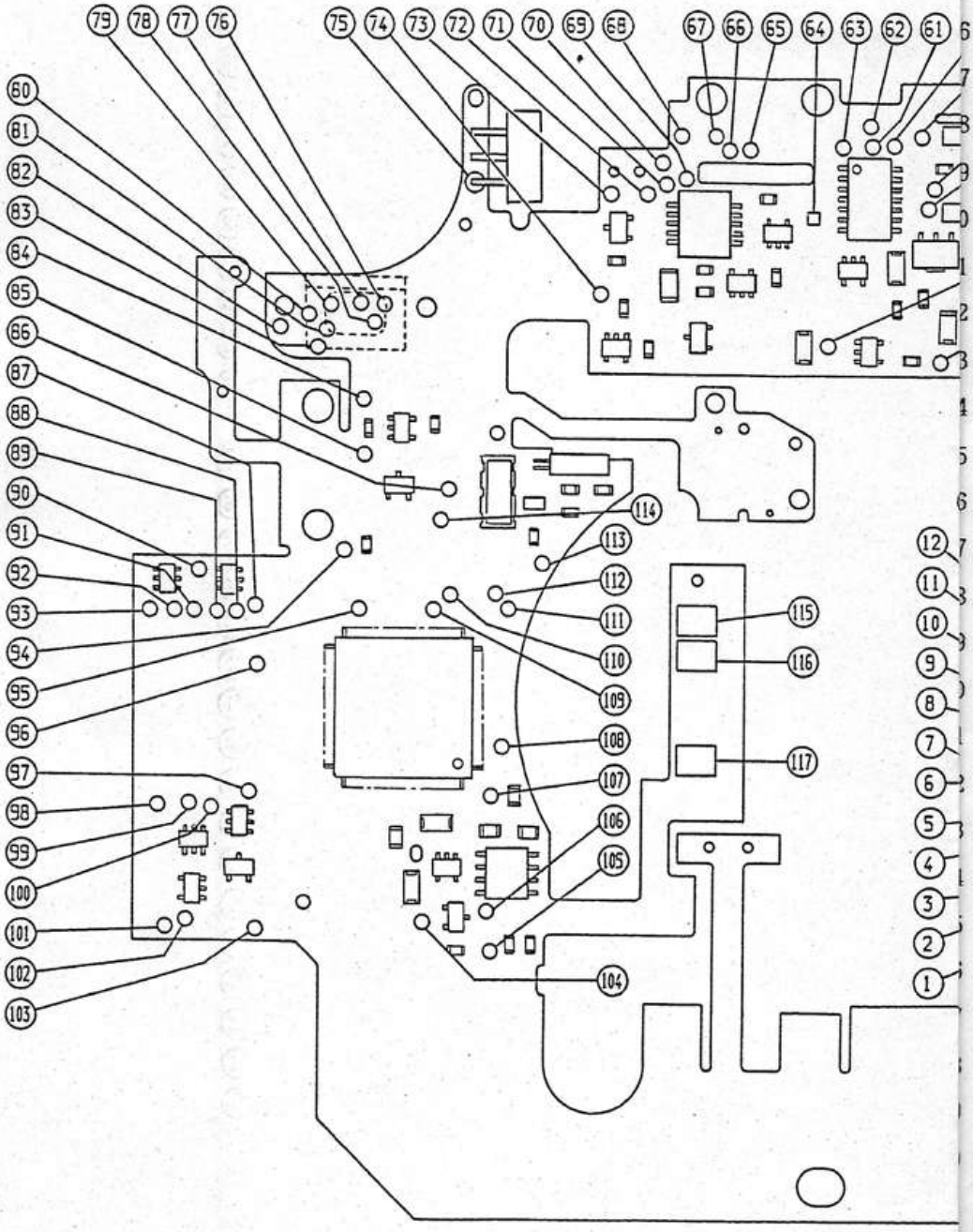



D305
R309
R314
C303
R303
R305
R304
Flash Connector
D304
D303
R311
L302

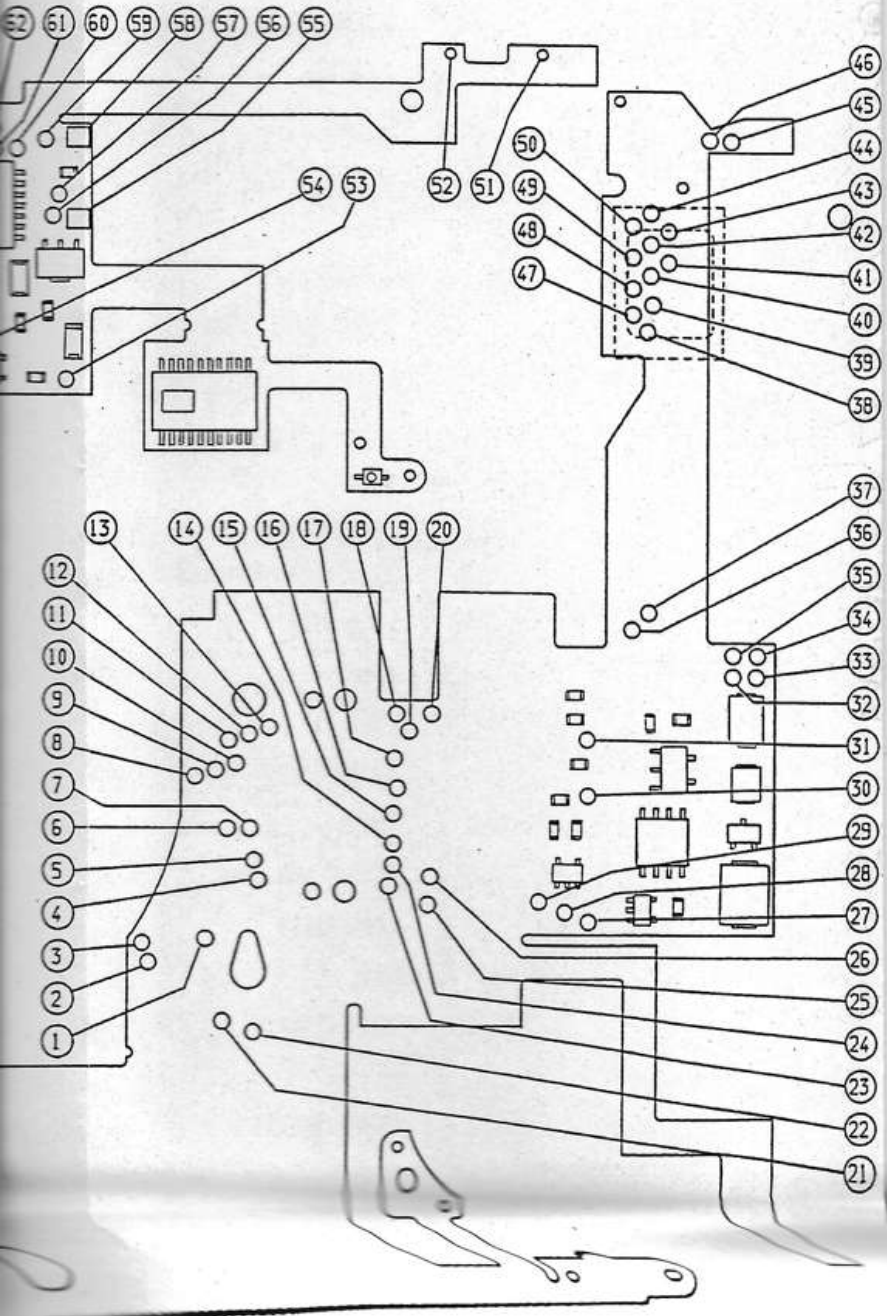

C305
Q306
C301
Q303
L301
D306


105
471
104
R310
R313
R307
102
Q307
R312
C308

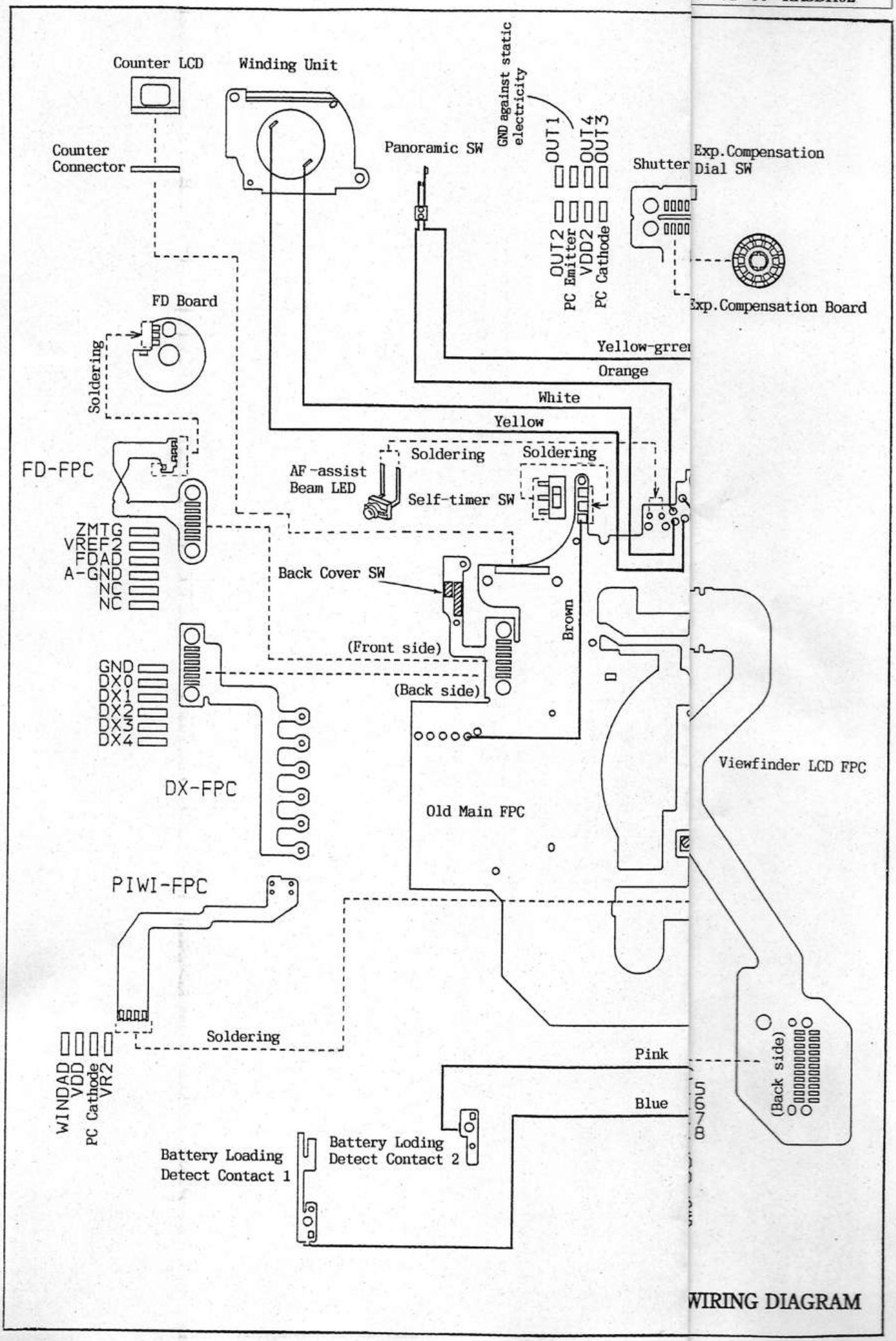
TEST POINTS OLD MAIN FPC ASS'Y



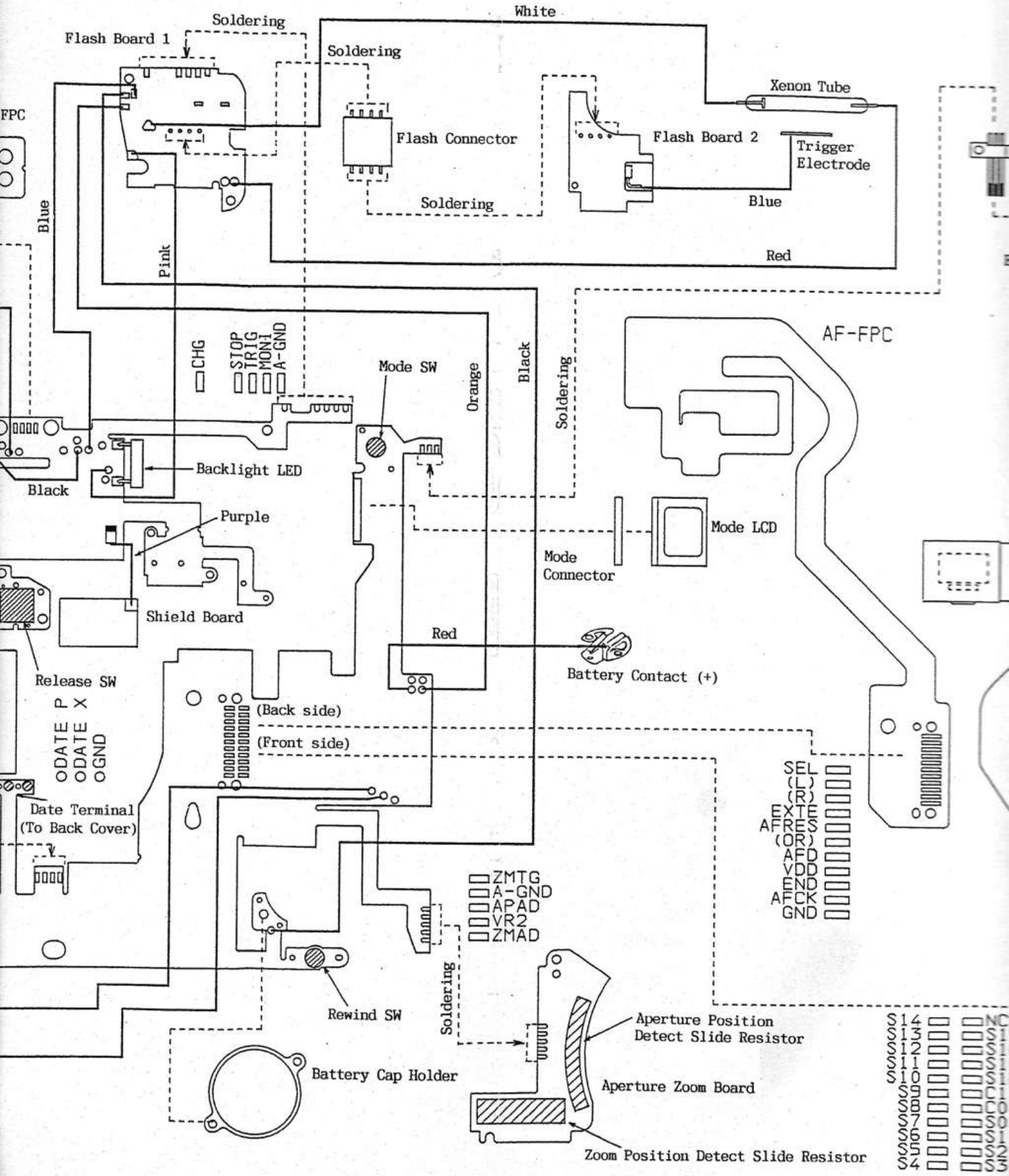
o.	Signal Name
9	SEG37
0	SEG38
1	SEG36
2	SEG39
3	SEG35
4	FDTG SW
5	Vref 2
6	FD AD
7	DX2
8	S3
9	DX3
0	S1 (CHECK)
1	(CONT)
2	S2 (RELEASE)
3	CONT
4	B COV
5	DX1
6	APAD
7	ZMAD
8	DATE P.
9	REW
0	STRB
1	Vcc
2	DATE X
3	DX4
4	WIND PC CATHODE
5	WIND AD
6	ROMCS
7	VL1
8	CUP AD
9	STOP
0	S0 · SEL
1	VPAD
2	SD2
3	TAD
4	DX0
5	ACK
6	SCK · AFCK
7	TEST


62
61
60
59
58
57
56
55
54
53
52
51
50
49
48
47
46
45
44
43
42
41
40
39
38
37
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
21
13
14
15
16
17
18
19
20
12
11
10
9
8
7
6
5
4
3
2
1

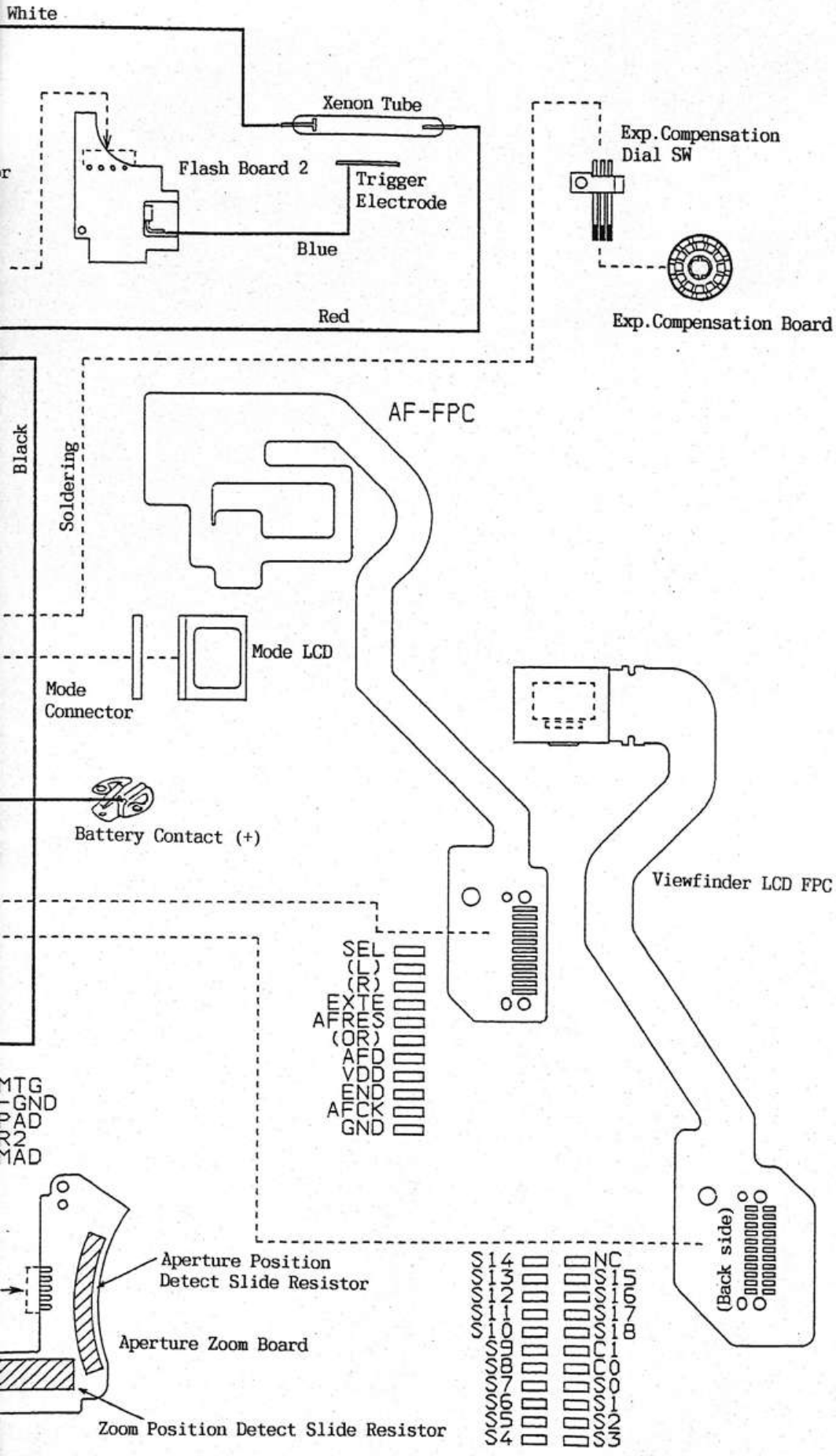
NO.	Signal Name	No.	Signal Name	No.	Signal Name
1	SEG0	40	SEG23	79	SEG37
2	SEG3	41	SEG22	80	SEG38
3	SEG4	42	SEG20	81	SEG36
4	SEG5	43	SEG19	82	SEG39
5	SEG6	44	COM 0	83	SEG35
6	SEG8	45	ECTG	84	FDTG SW
7	SEG7	46	ECDR	85	Vref 2
8	SEG9	47	SEG26	86	FD AD
9	SEG10	48	SEG24	87	DX2
10	SEG11	49	SEG21	88	S3
11	SEG12	50	COM 1	89	DX3
12	SEG13	51	TRG	90	S1 (CHECK)
13	SEG14	52	CHG	91	(CONT)
14	END・SIN	53	SELF LED CATHODE	92	S2 (RELEASE)
15	(AF・OR)	54	Vref	93	CONT
16	AF RES	55	Vdd	94	B COV
17	EXTE	56	VB	95	DX1
18	(AF・L)	57	VB	96	APAD
19	(AF・R)	58	BLGT LED CATHODE	97	ZMAD
20	AF D	59	OUT3(SH)	98	DATE P.
21	SEG17	60	GND	99	REW
22	SEG18	61	GND	100	STRB
23	SEG2	62	OUT4(SH)	101	Vcc
24	SEG1	63	Vdd2	102	DATE X
25	SEG16	64	SH PC CATHODE	103	DX4
26	SEG15	65	OUT2(SH)	104	WIND PC CATHODE
27	ZMTG SW	66	GND	105	WIND AD
28	GND	67	OUT1(SH)	106	ROMCS
29	RESET	68	-----	107	VL1
30	Vd chk	69	WIND MOTOR(-)	108	CUP AD
31	BC AD	70	PNRM	109	STOP
32	VB	71	WIND MOTOR(+)	110	SO・SEL
33	VB	72	ASIST LED CATHODE	111	VPAD
34	GND	73	ASIST LED ANODE	112	SD2
35	GND	74	SH PC EMITTER	113	TAD
36	SEG29	75	S3 (SELF-TIMER SW)	114	DX0
37	SEG28	76	SEG30	115	ACK
38	SEG27	77	SEG34	116	SCK・AFCK
39	SEG25	78	SEG31	117	TEST



WIRING DIAGRAM

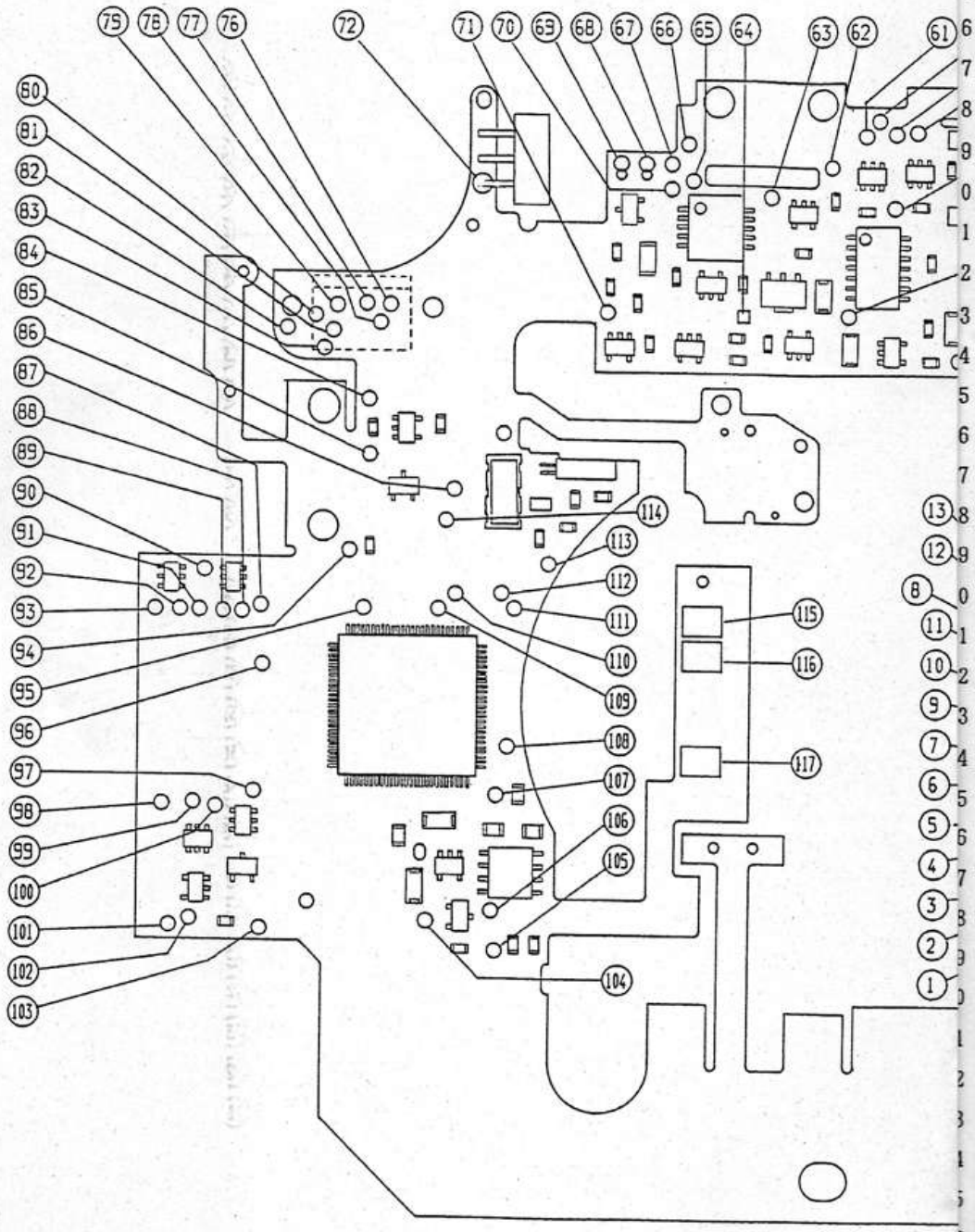

Soldering
Flash Board 1
Soldering
White
Xenon Tube
Flash Connector
Flash Board 2
Trigger Electrode
Soldering
Blue
Red
FPC
Blue
Pink
CHG
STOP
TRIG
MONI
A-GND
Mode SW
Orange
Black
Soldering
AF-FPC
Backlight LED
Black
Purple
Mode LCD
Mode Connector
Shield Board
Red
Release SW
Battery Contact (+)
DATE P
DATE X
GND
(Back side)
(Front side)
Date Terminal
(To Back Cover)
SEL
(L)
(R)
EXTE
AFRES
(OR)
AFD
VDD
END
AFCK
GND
ZMTG
A-GND
APAD
VR2
ZMAD
Rewind SW
Soldering
Aperture Position Detect Slide Resistor
Battery Cap Holder
Aperture Zoom Board
Zoom Position Detect Slide Resistor
S14
S13
S12
S11
S10
S9
S8
S7
S6
S5
S4
NC
S1
S1
S1
S1
C1
C0
S0
S1
S2
S3

OLD TYPE W

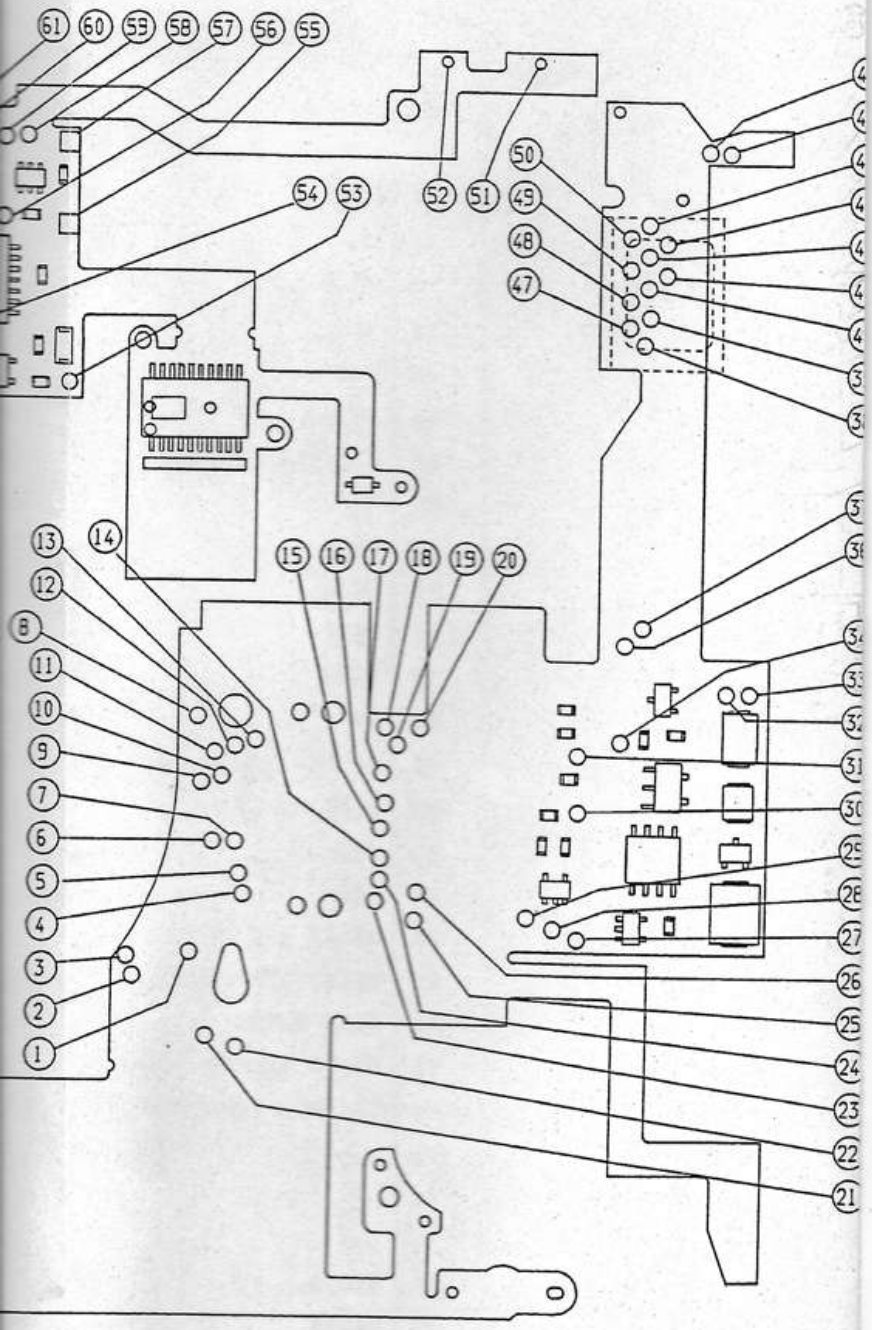


OLD TYPE WIRING DIAGRAM

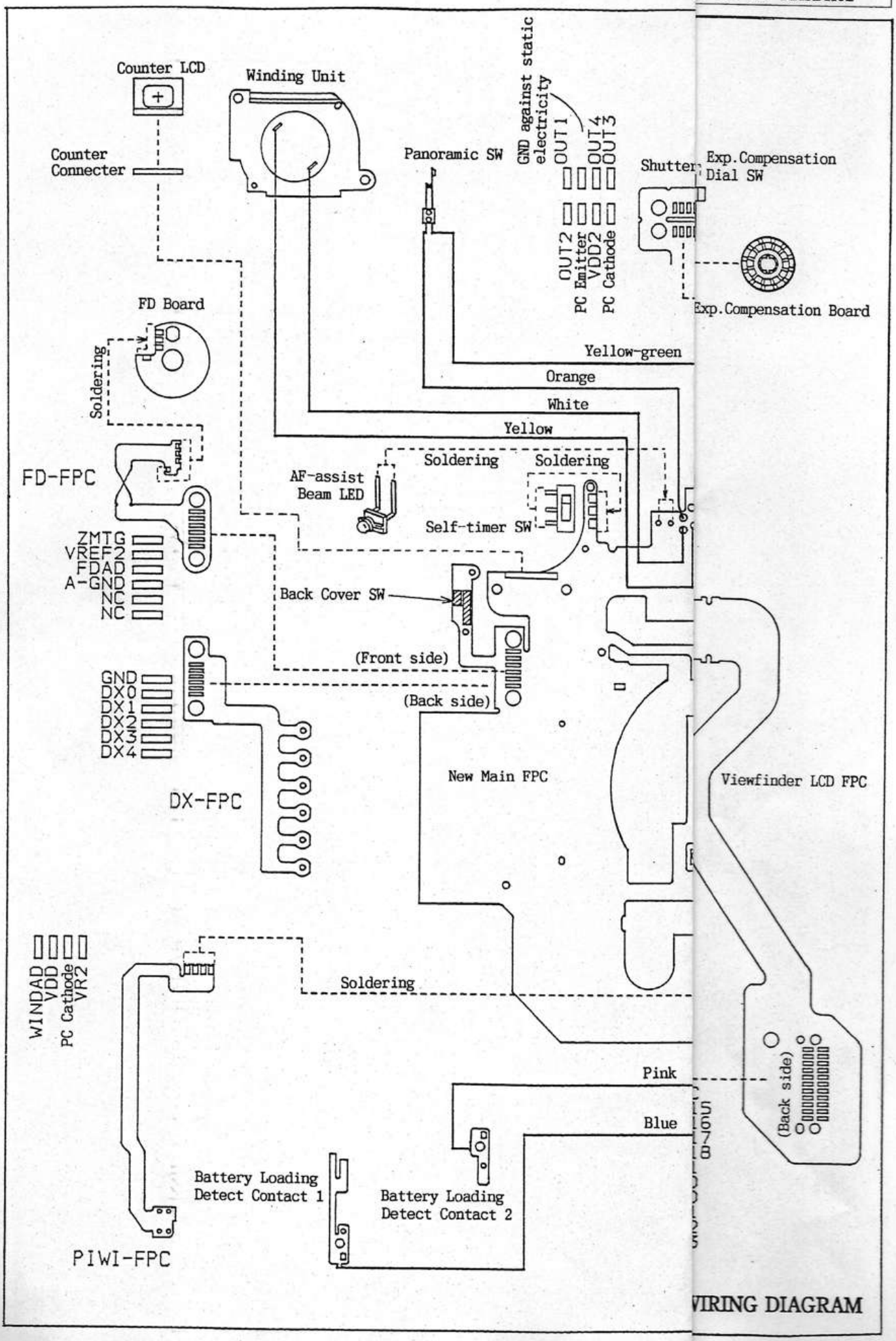
TEST POINTS ON NEW MAIN FPC ASS'Y



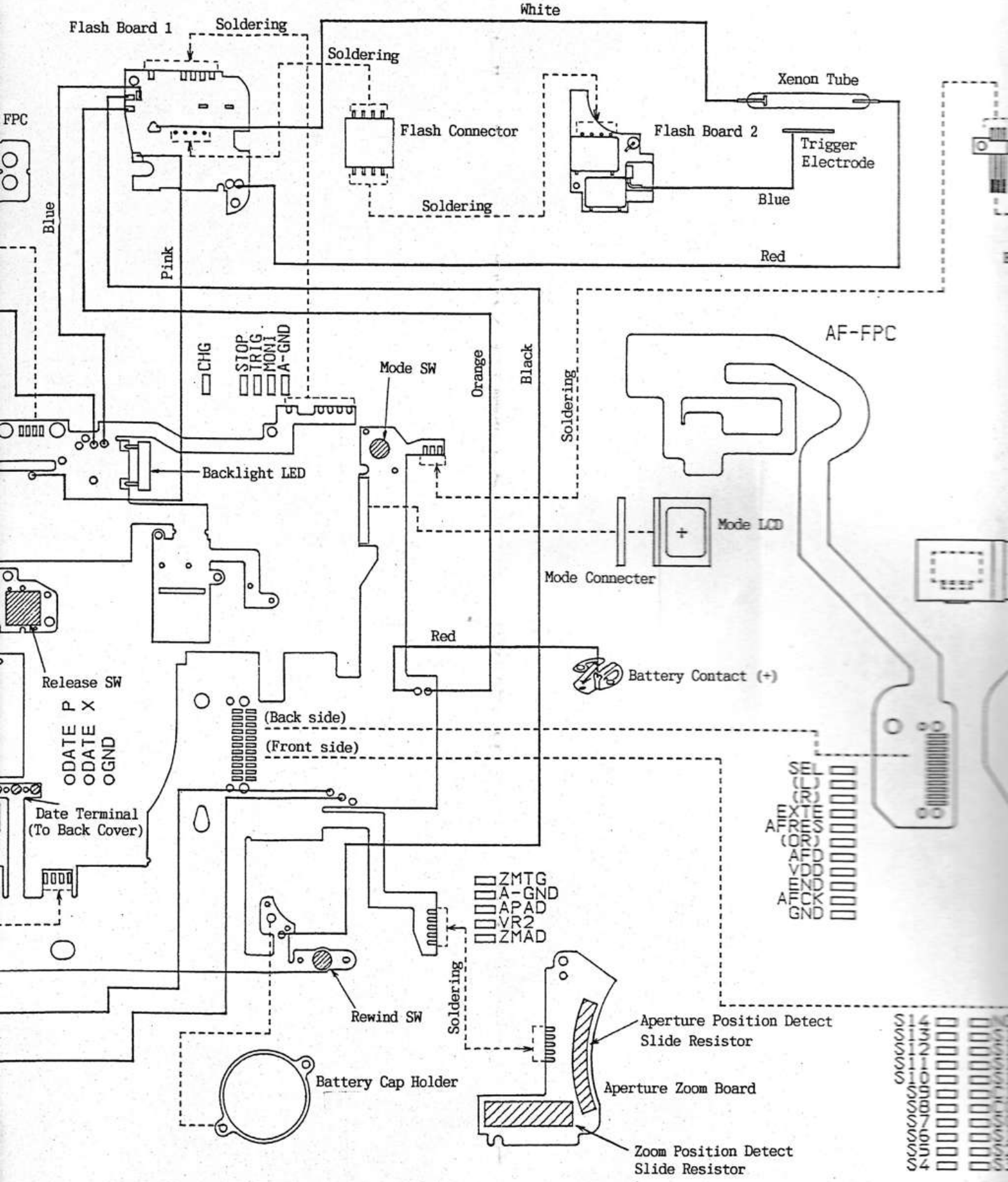
.	Signal Name
9	SEG37
0	SEG38
1	SEG36
2	SEG39
3	SEG35
4	FDTG SW
5	Vref 2
6	FD AD
7	DX2
8	S3
9	DX3
0	S1 (CHECK)
1	(CONT)
2	S2 (RELEASE)
3	CONT
4	BCOV
5	DX1
6	APAD
7	ZMAD
13 8	DATE P
12 9	REW
8 0	STRB
11 1	Vcc
10 2	DATE X
9 3	DX4
7 4	WIND PC CATHODE
6 5	WIND AD
5 6	ROMCS
4 7	VL1
3 8	CUP AD
2 9	STOP
1 0	SO · SEL
1	VPAD
2	SD2
3	TAD
1	DX0
5	ACK
5	SCK · AFCK
7	TEST


61
60
59
58
57
56
55
54
53
52
51
50
49
48
47
13
14
15
16
17
18
19
20
12
8
11
10
9
7
6
5
4
3
2
1
26
25
24
23
22
21

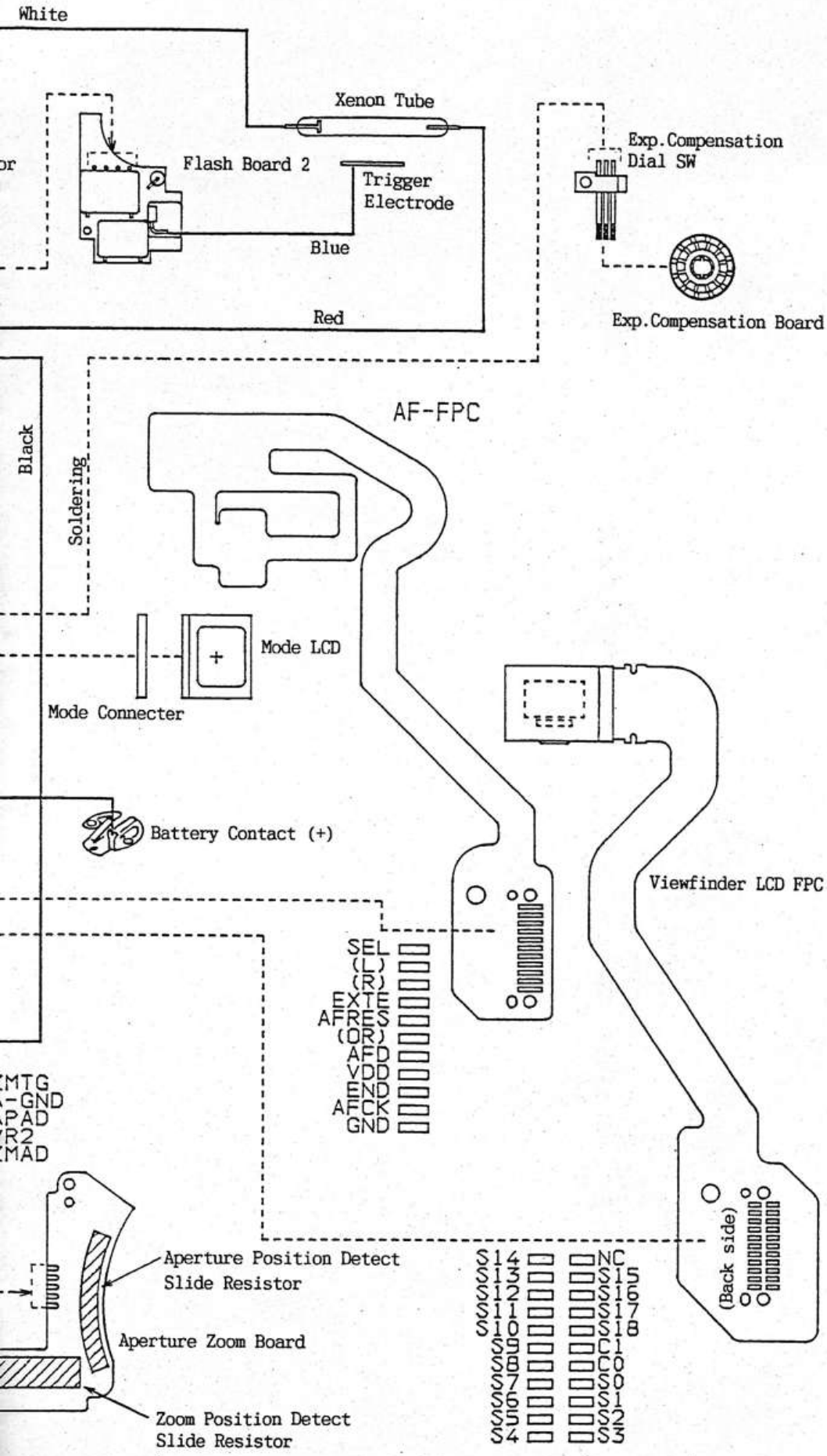
NO.	Signal Name	NO.	Signal Name	NO.	Signal Name
1	SEG0	40	SEG23	79	SEG37
2	SEG3	41	SEG22	80	SEG38
3	SEG4	42	SEG20	81	SEG36
4	SEG5	43	SEG19	82	SEG39
5	SEG6	44	COM0	83	SEG35
6	SEG8	45	ECTG	84	FDTG SW
7	SEG7	46	ECDR	85	Vref 2
8	SEG9	47	SEG26	86	FD AD
9	SEG10	48	SEG24	87	DX2
10	SEG11	49	SEG21	88	S3
11	SEG12	50	COM1	89	DX3
12	SEG13	51	TRG	90	S1 (CHECK)
13	SEG14	52	CHG	91	(CONT)
14	END・IN	53	SELF LED K	92	S2 (RELEASE)
15	(AF・OR)	54	Vref	93	CONT
16	AF・RES	55	Vdd	94	BCOV
17	EXTE	56	OUT2	95	DX1
18	(AF・L)	57	BLGT LED CATHODE	96	APAD
19	(AF・R)	58	GND	97	ZMAD
20	AF D	59	GND	98	DATE P
21	SEG17	60	OUT3	99	REW
22	SEG18	61	OUT4	100	STRB
23	SEG2	62	OUT1	101	Vcc
24	SEG1	63	VB	102	DATE X
25	SEG16	64	SH PC CATHODE	103	DX4
26	SEG15	65	WIND MOTOR(-)	104	WIND PC CATHODE
27	ZMTG SW	66	GND	105	WIND AD
28	GND	67	PNRM	106	ROMCS
29	RESET	68	ASIST LED CATHODE	107	VL1
30	Vd CHK	69	ASIST LED ANODE	108	CUP AD
31	BC AD	70	WIND MOTOR(+)	109	STOP
32	VB	71	SH PC EMITTER	110	SO・SEL
33	VB	72	S3 (SELF-TIMER SW)	111	VPAD
34	GND	73	---	112	SD2
35	---	74	---	113	TAD
36	SEG29	75	---	114	DX0
37	SEG28	76	SEG30	115	ACK
38	SEG27	77	SEG34	116	SCK・AFCK
39	SEG25	78	SEG31	117	TEST



WIRING DIAGRAM


Flash Board 1
Soldering
Soldering
White
Xenon Tube
FPC
Flash Connector
Flash Board 2
Trigger Electrode
Blue
Soldering
Blue
Red
Pink
CHG
STOP
TRIG
MONI
A-GND
Mode SW
Orange
Black
Soldering
AF-FPC
Backlight LED
Mode LCD
Mode Connecter
Red
Release SW
Battery Contact (+)
ODATE P
ODATE X
OGND
(Back side)
(Front side)
SEL
(L)
(R)
EXTF
AFRES
(OR)
AFD
VDD
END
AFCK
GND
Date Terminal
(To Back Cover)
ZMTG
A-GND
APAD
VR2
ZMAD
Rewind SW
Soldering
Aperture Position Detect
Slide Resistor
Aperture Zoom Board
Battery Cap Holder
Zoom Position Detect
Slide Resistor
S14
S13
S12
S11
S10
S9
S8
S7
S6
S5
S4

NEW TYPE



NEW TYPE WIRING DIAGRAM